



REPORT
OF
THE COMMITTEE
ON
COST OF PRODUCTION OF STEEL



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FOREWORD

We were appointed by the Government of India in August 1965 to examine the problem of the rising cost of production of steel, analyse all the factors going into the cost, assess the reasons for the increases; and advise them on the measures necessary to reduce the cost. A copy of the Government Resolution constituting the Committee is at Appendix 1.

2. In the course of our work, we visited the steelworks at Durgapur, Burnpur, Jamshedpur and Rourkela. We held discussions with the managements of these steelworks as well as with the Coal Controller. We were unable to visit Bhilai.

3. Our work was considerably facilitated by the excellent studies prepared by a number of Working Groups. The names of the members of these Working Groups have been set out in Appendix 2. We take this opportunity to acknowledge our gratitude to all these persons.

4. The first meeting of the Committee was inaugurated on the 25th September 1965 by Shri N. Sanjiva Reddy, who was then the Minister of Steel & Mines. We are grateful to him for his keen interest in our work. We had discussions also with the present Minister of Iron & Steel, Shri T. N. Singh. Our thanks are due to him for his courtesy and kind consideration.

5. Sarvashri S. L. Kirloskar and Karnail Singh could not be present at the concluding meetings of the Committee as they were abroad, although they participated in the earlier discussions and gave us the benefit of their advice.

6. Shri Jehangir Ghandy brought his vast experience of the industry to bear fully on the work of the Committee. Unfortunately, he could not participate in the concluding stages of our work, as he was in Europe. On his behalf, however, Shri S. K. Chaudhuri, Controller of Finance & Accounts, TISCO, participated in our final discussions and gave us the benefit of his wide experience.

7. We would like to make a special mention of the invaluable assistance rendered by the Secretary of the Committee, Shri C. V. S. Mani, all along our work. But for his deep knowledge of the details of the steel industry and passionate devotion to duty, the Committee could not have organised this complex investigation in a limited time. Shri Mani's analytical mind and the

indefatigable energy which he brought to bear upon this work made our task easy and smooth. Our most cordial thanks are due to him.

8. Finally, we would like to express our thanks and appreciation to Shri R. K. Chandrasekharan, who was deputed by the Comptroller and Auditor General for a brief period in connection with the Committee's work. The Committee would also like to place on record its special appreciation of the assistance given by Sarvashri P. M. Menon and V. S. S. Rajan, Senior Cost Accounts Officers, whose detailed knowledge of the subject proved of great help in our work.



CHAPTER I

THE PROBLEM AND ITS SETTING

1. Introduction:

1.1. There are few industrial products whose prices and production costs have attracted greater public notice than steel. In the United States, steel prices were subjected to Congressional scrutiny more than once in recent years. In Great Britain, a recent enquiry by the Restrictive Practices Court into what could be called the administration of steel prices by an association of producers aroused considerable public interest. In Europe, the High Authority of the European Coal and Steel Community keeps an unobtrusive watch over steel prices, stepping in to correct inflationary trends whenever they manifest themselves.

1.1.1. The underlying reasons for this interest in steel prices displayed by the authorities and the public of these countries are not far to seek. Steel is one of the important sinews of industry. Stability of steel prices ensures stability in the prices of manufactures in particular and wholesale prices generally. It helps to contain inflation and stimulate growth. This is brought out very clearly in a recent study of steel prices in the United States made by the Council of Economic Advisers to the U.S. President. It is worth quoting from this Report. It says:

"The recent fine record of steel prices has made a central contribution to the stability of industrial prices since 1959. Steel remains by far the most important industrial material, three times as large in industrial production as all other metals combined. Steel is such a widely used material that its price stability serves as a discipline to other competing materials, such as aluminium. It is also much the most important intermediate material for durable goods. The price of steel has a strategic significance—for the price-cost behaviour of American industry. Because steel is America's No. 1 industrial material, its price is viewed as a key indicator or barometer. A rise in basic wage rates in excess of productivity gains and a rise in the price of steel are the two cost charges most likely to upset the general stability of industrial prices."

1.1.2. In a developing country like ours the public concern for steel prices and production costs would understandably be even keener. First, in the countries like U.S.A., U.K., etc. steel is unlikely to be in the same unchallenged position as it is in our country as the most important process material for industry. Substitutes like plastics, aluminium, etc. have been developed in these countries, which have begun gradually but nevertheless firmly to challenge the primacy of steel. It would be safe to say that in India such substitution possibilities are unlikely for a very long time to come. Steel thus has a near monopolistic role as process material for industry and in consequence steel prices determine the prices of manufactures even more uniquely than elsewhere.

1.1.3. Secondly, in the present phase of our planned growth, steel forms an important content of the developmental projects. Steel prices have an important bearing on the cost of these projects and in a broader sense on the physical content of the developmental programme that is put through, given the constraints imposed by the availability of financial resources.

1.2. Steel Control:

1.2.1. Steel prices thus are of such central importance to the economy that even in countries where free market conditions prevail, regulation of these prices is deemed necessary in the public interest. For example, in the U.K., the Iron and Steel Board, a Statutory Board created under the U.K. Iron & Steel Act, 1953, notifies the maximum selling prices for sales within the country. In Japan, the main producers practise the Open Sales System under which steel is marketed at prices fixed in consultation with the Japanese Ministry of International Trade. In our country the prices as well as the distribution of steel were subjected to control in the context of demand for steel exceeding availability based on domestic production and imports. This control has a long history. In 1939, control was introduced for the first time over supplies of steel for war requirements. The prices of these supplies were settled at a negotiated basis. In 1942, the control over prices was placed on a statutory basis under the powers the Government assumed under the Iron & Steel (Control of Production and Distribution) Order 1941, by which the Iron & Steel Controller was empowered to fix maximum prices for different categories of iron and steel. From 1st July 1944, this control was widened to cover supplies for civilian requirements. From this time and until prices and distribution controls over a large number of categories of steel were removed on 1st March 1964, a more or less uniform system of price control was followed, while the system of distribution control experienced several procedural changes.

1.2.2. Our concern is with the **SYSTEM** of price control. This system had two important features. Firstly, it was a two-tier system. Government notified the prices at which steel could be sold to the consumers *viz.* the Selling Prices. The prices differed depending on whether the steel was obtained from the main producers (Col. 1 price) or controlled stockists (Col 2 price) or registered stockholder or any other source (Col. 3 price). Government also fixed the prices which the main producers could retain (*viz.* Retention Price). Since 1948-49, these retention prices were fixed on the basis of the recommendations made by the Tariff Board/Commission after assessments of costs and public inquiries.

1.2.3. **Cost Elements.**—The various elements of cost constituting “Works Cost”, “Retention Price” and “Selling Price” are as follows:—

(A) Works Cost:—

(a) Raw Material

(b) Operating Charges

- labour.
- Fuel & electricity.
- Stores and supplies.
- Services (steam, water transport, etc.).
- General works and administration expenses (incl. Township).

TOTAL (A)

(B) Overheads and Return:

- Head Office Expenses.
- Selling Expenses.
- Depreciation on gross block.
- Interest on Working Capital.
- Return on Gross Block.

TOTAL (B)

(C) ~~Ex-Works Price~~ $(A+B)$:
(Retention price).

(D) Additions to Retention Price:

- Excise Duty (Ingot/product).
- Railway Freight.
- Surcharge**

TOTAL (D)

(E) F.O.R. Rail Head.

(Consumer price/Selling price) $(C+D)$.

(**Note: Surcharge abolished with effect from 1-3-1964).

1.2.4. In the system of price control described earlier, the Companies sold steel at the notified (selling) prices but retained only what they were eligible to. The difference between the retention price and selling price was credited to the Iron & Steel Equalisation Fund. The Fund was originally created to subsidise the higher cost of imported steel, but has also been used for other purposes like equalising freight from the steel works to the destination railhead since 1956, subsidies to re-rolling industry, etc. It was from the Equalisation Fund that Government made certain Special Advances to TISCO and IISCO in 1954-55 to enable them to undertake their expansion projects.

1.2.5. The second characteristic feature of the price system is that steel is delivered at uniform prices at all railhead destinations in the country. This system was introduced in 1956. (Prior to 1956, the selling prices were ex-port. The two main producers, TATAS and SCOB charged the same selling prices at the main ports—Calcutta, Bombay and Madras. At any station inside the country they charged the port price plus place extras for freight). As mentioned earlier, freight equalisation was effected through the Equalisation Fund.

1.2.6. In the history of price control over steel, 1st March 1964 represents a major turning point. On this day, prices and distribution controls were relaxed over a large number of categories of steel where the demand-supply equation was considered

satisfactory. As at the end of March 1966, about 70% of steel despatches from main producers were of decontrolled categories and the balance of controlled categories. A body called Joint Plant Committee was set up and placed in charge of distribution as well as the fixation of selling prices of the free categories. This body has as its Chairman, the Iron & Steel Controller and as its Members, a representative each of the five integrated steel plants and a representative of the Railways. The Joint Plant Committee operates a Freight Equalisation Fund to equalise outward freight so that steel could be sold at uniform prices at all railheads. For meeting its expenses, the Joint Plant Committee charges a cess of Re. 1 per tonne of steel despatched. The Steel Equalisation Fund has been wound up with effect from 1st March 1964. In regard to the categories of steel which remain under Government control viz., Billets and Flat products, Government continues to notify their selling prices.

1.2.7. The point to note is that during the days of the steel Equalisation Fund the selling prices contained an element of surcharge over the retention prices which was originally intended to subsidise and sell imported steel at Indian controlled prices. The retention prices in turn contained an element of excise duty on ingot production to start with amounting to Rs. 4 per ton of ingot, but was increased later to Rs. 40 per ton of ingot in 1957. To arrive at the ex-works prices, suitable adjustments had to be made to the retention prices to allow for the excise duty. Since Equalisation Fund ceased to operate on 1st March 1964, selling prices are composed of the ex-works price, equalised freight, JPC cess and excise duty which is on the product and differs from product to product.

1.3. Trend in Prices:

1.3.1. What has been the trend of steel selling prices and ex-works price? The trend has been analysed for four categories of steel viz., light bars and structurals (from among shapes) and plates and hot rolled sheets (from among flats) and could be seen in statements I to IV.

1.3.2. Table 1 below summarises the trends in selling prices, ex-works prices and elements in price like excise duty on the one hand and freight surcharge and JPC cess on the other at three points in time; viz. (i) January 1949 (ii) 29th February 1964 (iii) prior to decontrol and (iii) 20th August 1965 (when excise duty on steel was enhanced as a result of the Supplementary Budget).

TABLE 1

Trends in selling prices and of constituent elements
(untested categories).

Per Tonne

Details	Light Bars		Structurals		Black Sheets		Plates	
	Rs.	Trend %	Rs.	Trend %	Rs.	Trend %	Rs.	Trend %
(a) Selling Prices on								
1st Jan. 49 . . .	295	100	285	100	315	100	282	100
29th Feb. 64 . . .	626	212	645	226	813	258	742	263
20th Aug. 65 . . .	683	232	713	250	897	285	792	281
onwards.								
(b) Freight & Surcharge and Cess								
1st Jan. 49 . . .	60		59		28		26	
29th Feb. 64 . . .	68		67		65		64	
20th Aug. 65 . . .	66		66		63		63	
onwards								
(c) Excise Duty								
1st Jan. 49 . . .	5		5		6		6	
29th Feb. 64 . . .	70		70		97		92	
20th Aug. 65 . . .	125		125		175		135	
onwards.								
(d) Ex-Works Prices								
1st Jan. 49 . . .	230	100	221	100	281	100	250	100
29th Feb. 64 . . .	488	212	508	230	651	232	586	234
20th Aug. 65 . . .	492	214	522	236	659	235	594	238
onwards.								

1.3.3. This table discloses that the selling prices have risen faster than the corresponding ex-works prices. Relatively steeper increases in excise duty, equalised freight and surcharge (during the Equalisation Fund period) contributed to this trend. The differentials between selling prices and ex-works prices are more now than in 1949. For the ordinary consumer of steel, however, what matters most are the selling prices. He tends to identify increases in selling prices as stemming from increases in ex-works prices. While, admittedly, ex-works prices of steel have risen significantly over the years, steeper increases in the other elements forming part of the selling prices have tended to strengthen the popular impression that our steel is excessively costly.

1.3.4. Often our selling prices are compared with the prices of imported steel which are lower. Such comparisons tend to give the impression that Indian steel is amongst the costliest in the world now. A moment's reflection would, however, show

that like is not being compared to like here. Firstly, as the analysis in the foregoing paragraphs disclosed, our selling prices are saddled with elements like excise duty and equalised freight. Ex-works prices would more correctly form the basis for comparison with steel prices abroad. Moreover, in regard to foreign steel, "home prices" in the respective countries are generally seen to exceed international quotations of export prices. Therefore, export orders have, for the exporting steel works, the character of additional orders which could be executed even at border line costs. An example would prove the point. One of the most representative quotations of export prices are those of the Brussels Exchange. In Table 2 below, the f.o.b. prices quoted at the Brussels Exchange over the years for Sections, Plates and Cold Rolled Sheets have been set out as a percentage of the prices quoted for merchant bars.

TABLE 2

FOB prices quoted at Brussels Exchange expressed as
per cent of the price of Merchant Bar.

Items	1957	1958	1959	1960	1961	1962	1964
Section	108	99	87	99	105	103	96
Plates	128	101	96	99	101	116	109
Cold Rolled Sheets.	175	167	180	145	131	146	135

1.3.5. One would particularly note the fluctuations in regard to plate prices. In some years, plates have been quoted at prices lower than those of merchant bars although the production of plates involves more rolling effort. It would therefore appear that the comparison of our selling prices with international export prices would not be realistic.

1.3.6. For a comparison on a like to like basis, it is felt that our ex-works prices should be compared with the ex-works prices in other countries. This has been done in Statement V for light bars, structurals, black sheets and thicker plates. A study of the statement discloses that in 1953 our ex-works prices for these four categories of steel were considerably lower than the prices for those products in any of the selected countries. Since 1953 our prices have risen faster than the prices in these countries. Even so, our ex-works prices for bars and structurals are even currently competitive with the prices of these categories in these countries although marginally so. Our prices for hot rolled black sheets and plates are less competitive.

1.3.7. This comparison has been attempted so that matters are viewed in the proper perspective. Even today our ex-works prices, such as they are, do not compare so unfavourably with similar internal prices (home prices) abroad. At the same time, there is no room for complacency. It is a matter of concern that our prices have risen faster than corresponding prices elsewhere. More importantly, the present level of ex-works prices in the country is related to the capital block per tonne of saleable steel capacity (Rs. 1176 per tonne) which is admittedly unrealistic. The capital block for the three HSL plants (Stage I) is about Rs. 2500 per tonne of saleable steel capacity. At the end of the Stage II expansions of these plants which would absorb the in-built capacities of Stage I, this capital block would be nearer Rs. 2000 per tonne. Even at this level and in so far as capital related charges are concerned the current ex-works prices are inadequate to the extent of about Rs. 100 per tonne of saleable steel.

1.3.8. For yet another reason the rising trend of ex-works prices of steel should cause concern. A general study of price trends discloses that the ex-works prices of steel have risen faster than the average ex-works prices of several other commodities. Four commodities were selected for a comparative study of this nature, viz. coal, cement, aluminium and sugar. In each case, freight and excise elements were segregated on the basis of information available. The resultant picture is set out in table 3 below:

TABLE 3

Comparison of ex-works price increases for selected products.

Commodity	Reference period	Price increases over Col. (2) periods	
		Commodity concerned (Col 1)	Steel
(1)	(2)	(3)	(4)
(i) Coal	January 1950 to 3rd February 1966.	% +81.5	% +104.1
(ii) Cement (Packed)	April 1950 to 31st December 65 (Pre-decontrol period)	+52.7	+104.1
Do.	April 1950 to 1st Jan. 66 (Post-decontrol period)	+80.8	+104.1
(iii) Aluminium (circles)	1952-53 to 8th Jan. 1966	+55.0	+77.6
(iv) Sugar	Sept. 1949 to Dec. 65.	+35.5	+114.0

1.3.9. This Table discloses that the increase in ex-works price of steel has been more than the increase in regard to the four selected commodities. Another significant fact is that the ex-works price of steel has risen faster than the general level of prices. As against an increase of 114 per cent in the ex-works price of steel between 1949 and 1965, the All Commodities Index of Wholesale Prices (1952-53=100) showed an increase of only 68 per cent during the same period.

1.4. It is right therefore that the rising trend of our steel costs should cause concern and induce a searching for the contributory factors. With this end in view, an analysis of the trend of our costs is attempted in the next chapter.

1.4.1. In analysing cost trends and comparing costs in the following pages, consideration has been given mainly to Works Cost as defined earlier. In comparing Works Costs between different plants there are some inherent difficulties due to differences in costing practices, differences in product mix and other variations. Inter-plant comparisons have therefore been made largely at the stage of ingot costs which has been considered as fairly representative for the purpose of such a comparison within the limitations mentioned.



CHAPTER II

ANALYSIS OF COST TRENDS

2. SECTION A—RETENTION PRICES

2.1. The Retention Price (i.e., the price including return) was first fixed in 1948-49 by the Tariff Board on the basis of cost assessment. The last study of the Tariff Commission covered the 1960-62 period. The structure of Retention Prices so determined continued till 29-2-1964 subject to escalatory adjustments. The Retention Prices were as shown in Table 4 during several periods :—

TABLE 4

Period	(Rs./per ton)	
	TATAS	IISCO
1-5-1949 to 31-12-1949	252	252
1-5-1950 to 31-12-1950	263	274
1-1-1951 to 30-6-1951	263	309
1-7-1951 to 31-12-1951	296	303
1-1-1952 to 31-3-1952	298	319
1-4-1952 to 31-12-1952	328	319
1-1-1953 to 31-3-1953	328	378
1-4-1953 to 31-3-1954	343	378
1-4-1954 to 31-3-1955	343	386
1-4-1955 to 15-5-1957	428·85	428·85
16-6-1957 to 31-3-1960	474·59	474·59
1-4-1960 to 31-3-1962	522·5	522·5
1-4-1962 to 31-3-1963	532·5	532·5
1-4-1963 to 30-6-1963	540·5	540·5
1-7-1963 to 29-2-1964	550·5	550·5

Note: (i) From 1-3-1964 retention and selling prices were made uniform and adjustments with equalisation fund abolished.

(ii) Same retention prices for the categories were extended to HSL units also as a result of the Tariff Commission's Inquiry for 1960-62 period.

(iii) The prices from 1-4-1960 are per metric ton.

2.2. RETENTION PRICES—(Tatas): Comparison between 1948/49 and 1960/62.

The average Retention Price fixed by Government for untested categories as a result of Tariff Board/Commission's studies was Rs. 248 per tonne (i.e. Rs. 252 per ton) for 1948/49 and Rs. 522.5 per tonne for 1960/62 period. The increase between these two periods, therefore, amounted to Rs. 274.5 per tonne (111%) over 1948-49. A break-up of the increase is given in Table 5.

TABLE 5

Items	Increase				
	1948/49	1960/62	Rs/Tonne	%	Composition %
	Rs/Tonne	Rs/Tonne			
Works Cost	153	306	153.0	100	55.5
Ingot Excise Duty	5	51.0	46.0	920	17.0
Overhead (including return)	90	165.5	75.5	84	27.5
Works Price	248	522.5	274.5	111	100.0

A broad analysis of the trend in increase shows that the "overheads" (which comprised of depreciation, return, interest on working capital, Head Office and Selling expenses, Contingencies, etc.) had gone up by about 84 per cent, ingot excise duty by 920% and works cost by about 100%. Of the total increase, Overheads constituted about 27.5%, ingot excise duty 17% and Works Cost 55.5%.

2.2.1. **Overheads :** Depreciation and return constituted a major part of the increase in Overheads. In the determination of Retention Prices, provisions for depreciation and return were related to "Gross Block" (i.e. the original cost of Fixed Assets).

2.2.2. The Gross Block in 1948/49, when TISCO had a capacity of 1 million Ingot tons, stood at Rs. 35 crores (or about Rs. 525 per tonne of saleable steel). The actual gross block of Tatas as on 31-3-1962 (1961/62) was about Rs. 189 crores. The 1960/62 Retention Price structure determined by Government took into account a gross block of only Rs. 179 crores i.e. Rs. 1176 per tonne of saleable steel based largely on TATAS' block for 2 million-tons of ingot capacity; or 1.5 million-tons of saleable steel with certain

adjustments. It will thus be seen that the Gross Block between 1948/49 and 1964/65 for saleable steel had gone up by Rs. 651 per tonne (124%). The net increase in overheads in 1960/62 over 1948/49 amounting to 84% was almost entirely related to the increase in the Gross Block. Increase in the cost of fixed assets per unit of capacity has thus contributed importantly to increase in the ex-works prices. A recent study cited by the Wage Board for the Iron & Steel Industry shows that the price of steel making equipment registered significant increases elsewhere also as indicated in table 6 below:

TABLE 6

Year.	Equipment Price Index.
1945	100
1950	148
1955	203
1960	251
1962	270

(Source : The Economist Intelligence Unit Ltd., (London) index for Capital replacement cost).

2.2.3. The current level of ex-works prices is related to a block of Rs. 1176 per tonne of saleable steel decided upon in the retention price determination in 1962. One should be under no illusion that this reflects the capital cost of a modern plant in the country. As table 7 below indicates, the capital cost of the HSL plants at Bhilai, Rourkela and Durgapur is considerably higher than the block adopted for the determination of retention price:

TABLE 7
CAPITAL BLOCK COST

Plants	Saleable Steel Capacity after current expansions	Capital Cost	Capital cost per tonne of saleable steel
	Million/ Tonnes	Rs. /crores	Rs.
Bhilai	1.965	313	1593
Durgapur	1.239	246	1984
Rourkela	1.240	248	2000
	4.444	907	2041

(Source : HSL Publication Statistics for Iron and Steel Industry in India-1964)

2.2.4. Steel is a capital intensive industry. Capital related charges naturally form a very important element of steel costs. As the foregoing analysis discloses, unit capital costs have gone up considerably in this industry and this has contributed in a significant way to the increase in the cost of production. In a later part of the Report, this subject of capital costs has been analysed further.

WORKS COST OF SALEABLE STEEL (In the Retention Price)

2.3. The Works Cost as reflected in the Retention Prices increased by Rs. 153 per tonne (i.e. 100%) in 1960/62 over 1948/49. The actual increase taking Basic Steel Ingot should however be about Rs. 157 per tonne of saleable steel (as against Rs. 153/-) after making certain adjustments for Acid Steel Ingot in 1948/49. A substantial part of this increase, viz., 69 per cent relates to the cost of Ingot steel and 23 per cent to Ingot Excise Duty, as can be seen from the table 8 below :—

TABLE 8

Items	1948-49	1960/62	Increase	Increase	Com- position
	Rs/Tonne	Rs/Tonne	Rs/Tonne	%	%
(i) Cost of Ingot .	120	260	140	117	69
(ii) Ingot Excise Duty .	5	51	46	920	23
(iii) Operating charges in Rolling Mills (incl. scrap) .	30	47	17	57	8
Works Cost of Sale- able steel.	155	358	203	131	100
Works Cost of Ingot adopted in the above prices.	95	238	143	151	..

(Note: The above prices include excise duty on Ingot of Rs. 3.94 in 1948/49 and Rs. 39.35 in 1960-62).

2.3.1. It is thus clear that a detailed study of the Works Cost of Ingot would disclose the important cost raising factors.

SECTION B

3. Actuals Work Cost of Basic Steel Ingot at Tatas

3.1. In the foregoing part, it has been demonstrated that the trend of the Works Cost of Ingot Steel would be representative of the trend of the Works Cost of Saleable Steel. In TISCO, Works Cost of Ingot (excluding excise duty) has varied over the years as shown in Table 9 below:

TABLE 9
WORKS COST OF INGOT AT TATAS

Period				Production (Basic)	Cost per tonne	Index
				(Tonnes)	Rs.	
1948-49	.	.	.	9,16,216	95.80	100
1954-55	.	.	.	10,55,093	125.42	131
1960-61	.	.	.	16,25,127	204.28	213
1961-62	.	.	.	16,46,492	217.82	227
1962-63	.	.	.	18,01,193	221.39	231
1963-64	.	.	.	18,93,922	234.32	245
1964-65	.	.	.	19,57,935	247.20	258

3.1.1. The increase in Actual Costs in 1964-65 over 1948-49 (excluding Excise Duty on Ingot) is about Rs. 151 per tonne of Ingot (158%).

3.1.2. The increase in cost has been further analysed by various elements constituting the cost in the attached statement No. VI. It will be seen therefrom that out of the total increase of about Rs. 151, the portion relating to gross materials (including fluxes) formed about 68 per cent; operating charges 45 per cent and there was an increase with credit for scrap, gas, etc. amounting to 13 per cent of the ingot cost.

3.1.3. Of the total increase of Rs. 151 per tonne, the portion attributable to "price and expense factors" represented about

TABLE 11

(Per Tonne of Ingot)

Items	1948-49	1964-65	Increase over 1948-49.		
			Rs.	%	Com- position %
	Rs.	Rs.			
(a) Prices					
Coal	19.89	46.52	26.63	134	26
Iron Ore	7.36	17.70	10.34	140	10
Limestone & Dolo- mite	3.02	8.95	5.93	196	6
TOTAL (a)	30.27	73.17	42.90	142	42
(b) Railway freight	12.40	40.64	28.24	228	27.
Grand Total (a)+ (b)	42.67	113.81	71.14	167	69

It will be seen that 42 per cent of the increase relates to variations in the prices of the four important raw materials and 27 per cent to Railway freight. Mention should be made here of the fact that an important contributory factor leading to the steep increase in the cost of coal is the deterioration in the quality of coal which has compelled the Steel Plants to use an increasing proportion of washed coal resulting in higher cost.

3.2.2. **Scrap.**—The increase in the cost of scrap, viz. 21% may not be viewed as really significant, as this reflected only the credit for scrap taken into account in the Rolling mills and the average rate obtained for such scrap applied to the quantities used in melting shops. This did not affect the cost structure of steel on an overall basis in view of the larger credit for scrap in the rolling mills.

3.2.3. **Ferro-Alloys.**—The important items used in Ferro-alloys were Ferro-Manganese, Ferro-silicon and Aluminium.

The increases were mainly due to increased prices for these materials, of which Ferro-Manganese (produced by Tatas) constituted a major element (about 8 per cent out of 9 per cent of the increase in the cost of materials indicated above.).

OPERATING CHARGES

3.3. The increase in operating charges between 1948-49 and 1964-65 was about 45 per cent of the total increase in the

Rs. 146 (97%) and "usage factor" about Rs. 5 (3%). (Price and expense factor represents increases in expenses and increased prices of raw materials stores, etc. Usage factor represents variations in usage of materials per tonne of product over 1948/49.). The preponderant influence of materials cost in the Works Cost of Ingot steel is thus manifest. It is also evident in a broad way that increases in price and related factors like salaries and wages and stores have accounted for the bulk of the cost increases.

MATERIALS

3.2. The total increase in the material costs (including fluxes) amounted to Rs. 103.33 per tonne or 68 per cent of the increase in the Cost of Ingot of Rs. 151/- per tonne as detailed below in table 10. (Statement No. VI refers).

TABLE 10

Items	(Per Tonne of Ingot)				
	1948-49 Rs.	1964-65 Rs.	Increase		
			Rs.	%	Composi- tion %
(a) Coal	26.93	62.90	35.97	134	35
(b) Iron Ore	11.31	34.16	22.85	202	22
(c) Limestone & Dolomite	4.43	16.75	12.32	278	12
(d) Scrap	10.49	31.71	21.22	202	21
(e) Ferro-Alloys	4.11	13.94	9.83	239	9
(f) Others	0.67	1.81	1.14	170	1
TOTAL	57.94	161.27	103.33 (68.0%)	178	100

3.2.1. **Price Increases.**—The four important raw materials which constituted the major part of the increase (viz., 69 per cent) were, coal, iron ore, limestone and dolomite. The impact of increase per tonne of ingot is analysed below in table 11 for (i) prices and (ii) Railway freight.

works cost of Ingot (Statement No. VI refers). In table 12 below, this has been analysed into its component elements :—

TABLE 12

(Per Tonne of Ingot)

	1948-49	1964-65	Increase		
	Rs.	Rs.	Rs.	%	Composition %
(a) Fuel, Steam & Power	12.56	38.61	26.50	207	17.2
(b) Labour	9.73	13.57	3.84	40	2.5
(c) Stores & Services	7.80	16.76	8.96	115	5.9
(d) Ingot Moulds & Bottoms	1.96	5.20	3.24	165	2.1
(e) Refractories & provision for repairs of furnaces	9.69	23.26	13.57	140	9.0
(f) Bye-product plant exps. (including sintering plant and lime kiln)	4.45	8.58	4.13	93	2.7
(g) General Works exp. (Administration & Town)	7.39	15.25	7.86	106	5.2
TOTAL	53.58	121.23	67.65	126	44.6 or 45 %

3.3.1. Fuel, Power, etc.—The increase of 17.2 per cent was mainly due to the variations in the price of coal which was reflected in the cost of blast furnace gas, coke oven gas and electricity. Another contributory factor was the use of fuel oil in the steel melting shops. The composition of the increase is set out below in Table 13.

TABLE 13

	Per Tonne of Ingot	
	Rs.	%
(a) Increase on account of coal price impact	10.5	7.0
(b) Fuel Oil	12.1	8.0
(c) Electricity Duty	0.8	0.5
(d) Purchased Power Cost	1.2	0.8
(e) Operating Expenses in Steam, Power & Water Plants	1.4	0.9
TOTAL	26.0	17.2

3.3.2. Labour.—The salaries, wages, etc. in the Production Departments had shown an increase of Rs. 3.84 (40 per cent) despite increase in production in 1964-65 of about 114 per cent over 1948-49. The trend in wage increase therefore represent about 198 per cent over 1948-49.

3.3.3. Stores & services.—The increase was about Rs. 8.96 per tonne (115 per cent) and was due to the combined effect of labour, steam, power, water, etc. The variation in cost constitutes about 5.9 per cent of the overall increase in cost of Ingot.

3.3.4. Ingot Moulds etc.—The increase of Rs. 3.24 per tonne (165 per cent) was mainly due to the Works Cost of pig iron from which the ingot moulds and bottom plates are produced. The incidence of the increase represents about 2.1 per cent of the overall increase in Costs of Ingot.

3.3.5. Refractories & Provision for Repairs of Furnaces.—The increase in refractories cost was about Rs. 2.56 (90 per cent). This was due to price increases. In the case of Provision for Repairs to Furnaces, the increase was about Rs. 11.01 (or 160 per cent). Of this, about Rs. 3 (44 per cent) represents increase in provision for relining blast furnaces and coke ovens and Rs. 8 (116 per cent) represents increases in the provision for relining steel melting shops.

3.3.6. General Works Expenses.—This covers the expenditure relating to the Administration and certain other Departments, Township, Technical Institute, etc. The increase on this account formed about 5.2 per cent of the total increase in Ingot Costs which was principally contributed by the increase in salaries and wages and stores.

3.3.7. Credit for recoveries.—The increased credit in 1964-65 over 1948-49 constituted about 13 per cent of the variations in the ingot cost. This resulted from increased realisations on Tar and Sulphate of Ammonia, Nut Coke and breeze, and increased values for Gas based on the trend in costs of coal. Similarly, scrap credit also had gone up.

3.3.8. To sum up the important cost raising factors relating to Works Costs are :

- (1) Raw material costs, in particular Coal, Iron Ore, Limestone and Ferro-alloys;
- (2) Labour Costs;
- (3) Stores including Ingot Moulds and Refractories;
- (4) Provision for re-lining and re-building blast furnace; and
- (5) Fuel costs.

3.3.9. These form the subject matter of detailed analysis in the succeeding chapters where Costs reduction possibilities are identified.

SECTION C

4. COMPARISON OF WORKS COSTS IN ALL STEEL PLANTS

4.1. General.—An attempt has been made in this Section to compare broadly the Works Cost of Ingot at the different plants. It may however be noted here that the methods adopted in working out costs by the different steel plants vary. To a certain extent, the costs thus worked out would vitiate a proper comparison from process to process upto Ingot stage. Certain examples are given below :—

4.1.1. Bye-product operating charges are charged to Coke Ovens and the credits for Bye-products based on coal equivalent values, sales realisation, etc. are credited to Coke Ovens, at TATAS and IISCO, whereas HSL plants give credit for Coke Oven gas only on joint cost basis with coke and treat the cost of Bye-products as distinct entities from the Coke Oven costs. The coke costs therefore, may not be comparable for all plants.

4.1.2. The services, workshop, etc. are distributed on different bases in TATAS, IISCO and HSL plants.

4.1.3. Valuation of Scrap is different from plant to plant. For instance, TATAS value light and heavy scrap differently whereas HSL plants adopt a uniform rate for all categories of scrap.

4.2. From the foregoing it is evident that uniform accounting is not followed in all the steel plants in determining costs. To enable proper comparison of costs in future in the context of the present system of uniform selling prices and uniform ex-works prices the different steel companies should by mutual discussions evolve a uniform accounting system. The Committee strongly recommends this for implementation.

4.3. With these limitations, a broad comparison of Works Cost of Ingot is attempted.

4.3.1. In Section 'B', the trend of actual "Works Cost" of basic steel ingot at TATAS has been analysed for the periods 1948/49 and 1964/65. The Ingot Cost at IISCO more or less followed the same pattern of trend as in TATAS. HSL Plants, which came into commercial production since 1960, however, showed fluctuations with the levels of production varying from year to year. A broad comparison of the Works Costs in all the steel plants for the various periods is given in statement No. VII relating to (i) Coke Ovens (for coke); (ii) Blast Furnaces for Iron Basic grades); and (iii) Melting Shops (for Basic ingot). We have forwarded to Government the detailed break-up

showing production, elements of cost and usages of important raw materials as a confidential enclosure.

4.4. It will be seen from Statement No. VII that the various steel plants had reached near capacity levels in 1964/65 and it would be useful to set out the results of the analysis of the Works Cost of Ingot steel attained in the other steel plants during this period for a proper comparison with TATAS. The details of comparable Works costs in 1964/65 are set out in statement No. VIII attached and summarised below in Table 14. (Details of usages, rates, Railway freight, etc., are given in Annexure to statement No. VIII). (Besides Works Costs in 1960/61 are also compared for all plants; and 1948/49 for TATAS).

TABLE 14

(Per tonne)

Plants	Works cost of ingot	Break-up of works costs					
		Materials		Operating costs		Credit	
	(Rs.)	(Rs.)	%	(Rs.)	%	(Rs.)	%
Tatas	247	159	64	123	50	(—)35	(—)14
IISCO	246	148	60	131	53	(—)33	(—)13
Rourkela	233	155	67	111	47	(—)33	(—)14
Bhilai	235	138	59	133	56	(—)36	(—)15
Durgapur	227	139	61	117	52	(—)29	(—)13

4.5. A detailed break-up of the important constituent elements of Costs in 1964/65 are given in Table 15 below expressed as percentages of the overall works costs of Ingot.

TABLE 15

(Per tonne of ingot)

Cost Elements : in 1964/65	Tatas	IISCO	Rourkela	Bhilai	Durgapur
	%	%	%	%	%
(A) MATERIALS					
(a) Coal	18.8	16.9	22.2	16.9	14.6
(b) Iron Ore	7.1	9.9	9.4	5.7	9.6
(c) Limestone & Dolomite	2.2	2.7	2.7	2.9	1.8
(d) Scrap	12.8	4.6	11.9	10.1	8.4
(e) Ferro-alloys	5.6	6.0	4.2	6.9	7.3
(f) Furnace oil	2.1	..	..	..	0.1
(g) Others	0.4	0.8	1.8	1.0	0.6
TOTAL	49.0	40.9	52.2	43.5	42.4

Cost Elements : in 1964/65	Tatas	IISCO	Rourkela	Bhilai	Durgapur
<i>Add.</i>					
(h) Railway freight on items a to c	15.4	19.3	14.6	15.1	18.7
TOTAL (A)	64.4	60.2	66.8	58.6	61.1
(B) OPERATING CHARGES :					
(i) Coke Ovens	6.5	6.9	5.8	5.7	6.1
(ii) Bye-product plants	1.3	1.5	..	..	..
(iii) Blast furnaces	8.9	12.0	11.2	10.2	9.8
(iv) Sintering Plants	1.5	..	..	1.8	..
(v) Melting Shops	29.6	28.7	23.5	30.4	32.6
(vi) Ingot Moulds	2.1	3.9	5.4	5.3	2.9
(C) EXTRA COST DUE TO USAGE OF POUNDRY IRON :	..	..	1.6	3.3	0.2
TOTAL (A TO C)	114.3	113.2	114.3	115.3	112.7
(D) LESS CREDITS :					
(a) Scrap	2.7	0.7	1.3	1.8	2.0
(b) Bye-products	2.7	2.6	..	..	..
(c) Breeze, etc.	1.7	1.5	0.1	1.4	0.2
(d) Gas	7.2	8.4	12.9	12.1	10.5
TOTAL WORKS COST OF INGOT :	100.0	100.0	100.0	100.0	100.0
	(247.20)	(246.49)	(232.71)	(235.32)	(226.95)

Usages	Kgs.	Kgs.	Kgs.	Kgs.	Kgs.
(i) Coal in coke	1591	1480	1563	1513	1442
(ii) Coke in Hot Metal	845	975	933	822	948
(iii) Hot Metal in Ingot	914	1009	860	767	828
(iv) Usage of washed coal	87.0%	12.3%	80.4%	82.8%	48.7%

MATERIALS

4.5.1. It will be seen from the above table that the major part of the cost ranging from 59 per cent to 67 per cent is contributed by materials. Of this, the freight element on main materials constituted 15 to 19 per cent. The higher freight element in IISCO and Durgapur was due to locational factors in regard to iron ore, limestone and dolomite. Excluding the freight, the cost of raw materials per tonne of ingot varied from 41 per cent to 52 per cent between the plants.

4.5.2. **Scrap.**—This is another item whose incidence varied from 5 per cent to 13 per cent between plants. It may be noted that there had been no uniformity between plants in the matter of assessment of rates for scrap and this vitiates the comparison for this element in Ingot costs. However, on an overall basis, this may not affect the cost of saleable steel as the credits for scrap in the rolling mills are offset by appropriate rates in the melting shops. If this item is excluded, the other raw materials would show variations in the range of 34 per cent to 40 per cent. Salient features relating to these items are discussed further.

4.6. **Yield.**—The yields on the materials processed in the melting shops at the different plants in 1964/65 were as shown in table 16 below :

TABLE 16
(Per tonne of ingot)

Items	Tatas	IISCO	Rourkela	Bhilai	Durgapur
	Kg.	Kg.	Kg.	Kg.	Kg.
Iron (hot Metal)	914	1009	860	767	828
Scrap	259	170	292	252	221
Ferro-Alloys	15	17	10	18	16
Iron Ore	21	22	3	183	174
Scale	2	8	..	2	..
TOTAL	1211	1226	1165	1222	1239
Less: Credit	43	40	33	46	29
Net Materials :	1168	1186	1132	1176	1210
Yield	85.6%	84.3%	88.3%	85.0%	82.6%

(Note.—On the basis of metallic content, the yields would be different).

4.6.1. The lower yields at Bhilai and Durgapur were due to the larger quantities of Iron Ore, the metallic content of which is lower relatively to the metallic content in Hot Metal and Scrap. TISCO and IISCO's yields were relatively lower to that of Rourkela due to loss of part of Hot Metal in the Bessemer and Duplex convertors.

4.7. **Coal.**—Coal is an important item which constituted about 15 per cent to 22 per cent of the cost of ingot. Any variation in the prices of this item, therefore, will have a substantial impact on the cost of steel. The consumption of Coal (both washed and unwashed) varies from plant to plant, viz., 1442 kg. to 1591 kg per tonne of Coke. The proportion of washed and unwashed coal consumed in 1964-65 were as shown in Table 17 below :

TABLE 17

	Washed coal percen- tage	Unwashed coal percen- tage
TATAS	87.0	13.0
IISCO	12.3	87.7
ROURKELA	80.4	19.6
BHILAI	82.8	17.2
DURGAPUR	48.7	51.3

4.7.1. **Coke.**—The consumption of Coke per tonne of hot metal varied from 822 Kg to 975 Kg. The lower consumption was in Bhilai (822 Kg) and TATAS (845 Kg). It may be pointed out that the lower consumption at TATAS was due to injection of fuel oil in the blast furnaces of about 28 Kg. The high ash content in the coal charged into the Coke Ovens accounted for increased consumption of Coke in the other steel plants. The ash content in coal in IISCO and DURGAPUR were as high as 19.7 per cent. The ash content in coal at ROURKELA was, however, 16.3 per cent but the consumption of coal was high at 1563 kg. per tonne of Coke.

4.7.2. **Iron Ore.**—The consumption of Iron Ore for hot metal at TATAS (including sintering plants) and at Durgapur are higher compared to the other plants by about 5 to 7 per cent. This might be due to variations in the Iron content in the Ore, etc. However depending on the consumption of hot metal for Ingot, these have varied (Annexure to statement No. VIII refers).

4.7.3. Limestone & Dolomite.—The consumption (including sintering plant) at Bhilai was 544 Kg. per tonne of Hot Metal compared to the other plants where the range was 372 Kg. to 431 Kg.

4.7.4. Scrap.—The use of scrap in the blast furnaces constituted about 3 per cent in TATAS and IISCO. This item does not significantly affect the Costs. Scrap used in the melting shops ranged from 170 Kg in IISCO to 292 Kg in Rourkela. The lower consumption of Scrap at IISCO was as a result of larger usage of hot metal for Ingot making.

4.7.5. Ferro-alloys.—The incidence of Ferro-Alloys, comprising Ferro-manganese, Ferro-silicon and Aluminium, etc. ranged from 4 per cent to 7 per cent in the different plants and was mainly contributed by Ferro-manganese. The costs of these at Bhilai and Durgapur were high.

4.7.6. Furnace Oil.—TATAS have taken up the usage of furnace oil in the blast furnaces to reduce coke consumption and in coke ovens to increase bulk density. Such usage formed about 2 per cent of the total Works Cost of Ingot. Similarly, Durgapur used furnace oil for some time in the blast furnaces, but the incidence of this was small. During the Committee's visit to Durgapur they were informed that the use of furnace oil was given up as it was found that the replacement ratio attained was such as increased cost of production of hot metal.

4.7.7. Railway Freight.—The element of Railway freight on the important raw materials, viz., Coal, Iron Ore, Lime-stone and Dolomite formed about 15 per cent to 19 per cent in the different plants. In the case of TATAS the freight in 1948-49 was only about Rs. 12 per tonne of Ingot and this has gone up to Rs. 38 per tonne in 1964-65. The increase of Rs. 26 formed about 11 per cent on 1964/65 costs. The actual freight in 1964-65 in respect of all the plants is given in table 18.

TABLE 18

Plants	1964-65	
	Rs.	percentage
TATAS	38.06	15.4
IISCO	47.58	19.3
ROURKELA	33.93	14.6
BHILAI	35.53	15.1
DURGAPUR	42.51	18.7

4.7.8. **Other Materials:**—Due to larger usage of manganese Ore, the cost of other items is high by about 1 per cent at Rourkela compared to other plants.

OPERATING CHARGES

4.8. The element of gross operating charges in the Coke Ovens, Blast Furnaces (including sintering plants) and melting shops taken together per tonne of Ingot is compared in Table 19 below :—(Details are given in Statement VIII).

TABLE 19

Plants	(Per Tonne of ingot)					
	(1964/65)					
	Coke Ovens	Blast Fur- naces (incl. pig casting)	Sinter- ing Plants	Melting Shops	Extra use of Foundry Iron	Total
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
TATAS	19.24	22.02	3.64	78.46	..	123.36
IISCO	20.64	29.61	..	80.29	..	130.54
ROURKELA	13.56	25.96	..	67.33	3.81	110.66
BHILAI	13.50	23.89	4.29	83.85	7.83	133.36
DURGAPUR	13.87	22.16	..	80.53	0.54	117.10

4.8.1. **Coke Ovens:**—The impact of the Coke oven operating charges at TATAS and IISCO were higher due to larger usage of hot metal in Ingot (viz., 914 Kgs and 1009 Kgs respectively) compared to HSL plants where such usages ranged from 767 Kgs to 860 Kgs.

4.8.2. **Blast Furnaces.**—Even though, the incidence of Blast furnace costs compares well between TATAS and H.S.L. Plants, this is not really so as the higher consumption of Hot Metal at TATAS has offset the operating charges based on lower consumption at H.S.L. Plants. The high cost at IISCO was due to lower production as a result of shut-down of a blast furnace for some period in 1964/65, and also a high usage of hot metal in Ingot.

4.8.3. **Sintering Plant.**—Only TATAS and Bhilai have sintering plants where Iron Ore fine, Limestone and Dolomite and Coke breeze are made into sinter and used in the blast furnaces. The

additional cost on this account was 1.5 per cent at TATAS and 1.8 per cent of the Ingot cost at Bhilai. The higher incidence at Bhilai was due to higher usage of sinter in hot metal.

4.8.4. Melting Shops.—The operating charges at the melting shops are comparable with the exception of Rourkela where the cost has come down due to L.D. process, mainly due to low cost of oxygen.

4.8.5. Ingot Mould.—The cost of Ingot moulds per tonne of Ingot is high in IISCO, Rourkela and Bhilai which ranged from 3.9 per cent to 5.4 per cent against 2 to 3 per cent in TATAS and DURGAPUR.

4.8.6. Extra Cost of Foundry Iron.—TATAS and IISCO used only "Basic Grade Iron" for steelmaking. The HSL Plants partly used costlier "Foundry Grade" iron besides basic grade iron which involved an extra cost of about 2 to 3 per cent of the total cost of Ingot. However, the usage at Durgapur was small.

4.9. Credit for Recoveries.—This comprises items, such as Credit for gas (both in Coke oven and Blast furnaces); Pearl, Nut coke and Breeze; sulphate of Ammonia, Benzol and Tar (in TATAS and IISCO only); and recoveries for scrap in Blast furnaces, melting shops and converters. The variations in credit for scrap, coke breeze, etc., were not wide. Credit for Gas at H.S.L. Plants however was larger than in TATAS and IISCO as the bases for valuation of Gas were different. TATAS and IISCO adopted "coal equivalent basis" for gas whereas H.S.L. Plants adopted "joint cost basis" for gas (coke oven cost distributed on pro-rata weight basis for coke and gas). Bye-Product plant expenses and recoveries were included in TATAS and IISCO's coke oven costs, while H.S.L. treated bye-products plant operation as separate departments not connected with steel production and afforded credit only for Gas. Even though the different methods adopted in these plants vitiated a proper comparison of Ingot Costs, by and large the credits for gas afforded in coke ovens were offset by corresponding costs charged for gas in the Rolling Mills.

5. Summary of Ingot Cost.—The Works Costs of ingot at the different plants ranged from Rs. 227 to 247 per tonne during 1964/65 as indicated below :—

	(Rs./Tonne)
TATAS	247
IISCO	246
ROURKELA	233
BHILAI	235
DURGAPUR	227

5.1. A broad analysis is made below for the variations over Durgapur which has attained the lowest cost of ingot.

(Rs./Tonne)

Items	Variations over Durgapur			
	TISCO	IISCO	ROURKELA	BHILAI
(a) Raw material prices (incl. Rly. freight)	7	17	7	(—)6
(b) Scrap (net)	10	(—)6	10	5
(c) Operating charges	6	13	(—)6	16
TOTAL	23	24	11	15
(d) Less credit for Bye-products, etc.	3	5	5	7
NET TOTAL	20	19	6	8

5.1.1. It will be seen from the above that the major variations are brought about by prices and railway freight on raw materials, which are discussed separately.

5.1.2. The variations in scrap also form a major part. This is due to different valuations adopted by the different steel plants. If uniform basis is adopted by the different plants, then the variations would be comparable.

5.1.3. Operating charges and credit do not reflect large differences and these are attributable to different processes in the several plants, such as, sintering, converters, etc.

5.1.4. **General.**—For the purposes of the foregoing analysis we have proceeded on the basis of cost data furnished by the plants. In the nature of things, we could not make our own investigations.

SECTION—D

6. Impact of Government Levies and Railway Freight on Materials

6.1. The Committee considered it useful to assess the total impact of Government imposts and railway freight on materials on the works cost of steel. Data was therefore called for from the major steel plants. A comparative statement of the incidence of these elements on (i) ingot and (ii) saleable steel in 1948-49 and 1964-65 in respect of TATAS is set out below in Table 22.

TABLE 22
IMPACT OF GOVERNMENT IMPOSTS ON STEEL
AT TATAS
(A) ON INGOT

Details	1948-49	1964-65	(Per Tonne)	
			Increase in 1964-65 over 1948-49	
			Compo- sition	
	Rs.	Rs.	Rs.	%
1. <i>Duty & Levies</i>				
(a) Excise Duty (Ingot)	4	41	37	49
(b) Other Levies (Royalty Cess, Import Duty, Taxes, Apprentices Act, etc.)	2	10	8	11
2. Total (a) + (b)	6	51	45	60
3. Railway Freight on materials used in production	13	43	30	40
4. Total (2+3)	19	94	75	100
5. Works Cost (Excluding Ex- cise Duty)	96	247	151	..
6. Works Cost (including Ex- cise Duty [(a)+5])	100	288	188	..
7. Duties, etc. as a percentage of Works Costs (including Excise Duty) (6)				
(i) Excise Duty (Ingot) and Levies (2)	6	18	..	..
(ii) Railway Freight (3)	13	15	..	..
(iii) Total Imposts and Rail- way Freight (4)	19	33	..	..
(B) SALEABLE STEEL				
1. Excise duty (Ingot)	5	51	46	29
2. Product Excise Duty	..	56	56	36
3. Railway Freight (Materials)	17	56	39	25
4. Other levies, such as Ro- yalty Cess, Import Duty, Taxes, Apprentices Act, etc.	4	19	15	10
TOTAL	26	182	156	100

- Note.— (i) Figures are as furnished by TATAS.
(ii) In 1948-49 excise duty was levied only on ingot. With effect from 1st March, '64, when several categories were decontrolled, excise duty ceased to be levied on the ingot and was levied wholly on the product.
(iii) A comparative statement of the impact of Government levies and railway freight on materials in respect of four steel works is set out in Statement No. IX.

6.2. The above Table indicates that between 1948-49 and 1964-65 the increase in the works cost of ingot steel including excise duty amounted to Rs. 188. Of this, the increase on account of the incidence of excise duty and other Government levies was Rs. 45, i.e., 24 per cent. The increase due to increase in railway freight on materials used in production amounted to Rs. 30 or 16 per cent. The increase in duty, levies and railway freight on materials together amounted to Rs 75 or 40 per cent of the increase of Rs. 188.

6.3. The foregoing discloses that the INCREASES in the impact of excise duty on ingot, other Government levies and of railway freight on materials on the cost of production of steel have been significant cost raising factors.



CHAPTER III

RAW MATERIALS

7. General

7.1. Raw materials, particularly coal, iron ore, limestone and dolomite, constitute a major element in the cost of iron and steel production; the raw materials cost expressed as a per cent of total works cost per tonne of steel ingot is given in Table 23. It will be seen that in recent years raw materials have formed 45 to 50 per cent of the works cost.

TABLE—23

Raw Material Cost as per cent of Ingot Steel Cost

Plant	1948-49	1954-55	1960-61	1964-65
TISCO	43	40	45	46
IISCO	..	38	47	49
HSL	..	..	35	45

7.2. An idea of the enormous quantities of raw materials needed and the tremendous increase in their demand for iron and steel production will be obtained from Table 24.

TABLE—24

Raw Materials Consumption

(In million tonnes)

	1948-49	1954-55	1964-65
Coal	1.56	3.25	8.80
Iron Ore	1.51	2.78	12.69
Limestone	0.64	0.67	3.59

7.2.1. Though with technological innovations, the consumption of raw materials per ingot tonne of steel is on the decline, the prices of the materials have risen at such a rapid rate that their increase has more than offset the decrease in the raw materials consumption. Although the prices of raw materials have increased all over the world, the rise in India is much higher than in other steel producing countries. This is indicated by a comparison of the home iron ore prices of Germany, France, and U.K. with those of TISCO and IISCO (See Statement No. X). The indices show that during the six year period from 1956 to 1962 the price rise varied in the selected countries from 10 to 30 per cent. In India the price increase was in the range of 50 to 60 per cent during more or less a comparable period from 1954-55 to 1960-61.

7.3. The following analysis in this chapter will give an idea of the part played by raw material prices and supply conditions in raising the cost of production of steel. The three most important materials—coal, Iron ore and limestone are discussed here.

A—COAL

7.3.1. As indicated in Table 24, the demand for metallurgical coking coal nearly doubled in 1955 and increased six-fold in 1965 from 1948-49 levels. This large demand coupled with deterioration in coal quality forced the steel plants to resort to higher per cent of washed coal in the charge.

7.3.2. The three factors directly affecting the cost of coal in a steel plant are (i) the price of coal (ii) the freight charges and (iii) the price and amount of washed coal in the total coal make.

7.4. **Coal Price.**—The gradewise price of coal is given in statement No. XI for the period 1958 to 1962, and in statement No. XII from 1962 to 1965. Between 1958 and 1962, the rise in price for various grades ranged between 11 per cent and 30 per cent, the highest increase taking place in coal with the low ash contents. Similarly, between 1962 and 1965, price increases varied between 24 per cent and 41 per cent, again the higher increases being for the low ash content coals. The total net increase between 1958 and 1965 varied between 36 per cent and 82 per cent.

TISCO

7.4.1. The total requirements of TISCO are met partly from their own raisings and partly from outside sources. The average price of purchased raw coal of all grades (excl. freight) increased

from Rs. 15:60 per tonne in 1949 to Rs. 27:30 per tonne in 1965, an increase of 75 per cent. Similarly, the raising cost of its own coal increased by 48 per cent during the same period, as in Table 25 below :—

TABLE 25
VARIATION IN TISCO COAL PRICE

Item	Source	Coal Cost (Base 1948/49=100)		
		1954/55	1960-61	1964-65
Raw Coal	Own	94	152	148
	Purchased	97	141	175
Washed Coal	Own	..	100	131
	Purchased	..	100	187
Average ash content % .		16.48	17.88	17.52

(Note.—Washed coal base year is 1961).

From 1960-61, the use of washed coal increased rapidly; in 1960-61; 1963-64 and 1964-65, the per cent of washed coal in the coal charge being 41.5, 91.3 and 87 respectively. In spite of large quantity of washed coal in the charge, the average ash content did not improve attesting to the rapidly deteriorating quality of raw coal.

IISCO

7.4.2. The coal requirements of IISCO are met by purchase and from their own raisings. The average cost of purchased raw coal of all grades (excl. freight) increased from Rs. 14.39 per tonne in 1954-55 to Rs. 26.72 per tonne in 1964-65 an increase of 86 per cent. Similarly, the raising cost of own coal increased by 180 per cent during the same period as in Table-26 below.

TABLE 26
VARIATION IN IISCO COAL PRICE

Item	Source	Coal Cost (Base 1955=100)		
		1954-55	1960-61	1964-65
Raw Coal	Own	100	195	280
	Purchased	100	156	186
Washed Coal	Purchased	..	100	140
Average ash content % .		15.74	17.94	19.55

The per cent of washed coal in the total intake increased only slightly from 7.5 in 1960-61 to 12.3 in 1964-65. The large deterioration in coal quality since 1955 is attested by the large increase in ash content.

ROURKELA

7.4.3. Rourkela draws its raw coal from Jharia and Bokaro coal fields and washed coal from Dugda and Bhojudih washeries. The total cost increases during 1961-65 are given in Table 27.

TABLE—27

Variation in Rourkela coal Price

Item	1960-61 Cost Index (Base 1961=100) 1964-65	
	Rs/tonne	
Raw Coal	35.96	110
Washed Coal	45.39	130
Washed Coal in the total intake	53%	80%
Average Ash content	16.51%	16.28%

(Note.—The above prices are inclusive of freight. No separate break-up available for 1960-61. 1964-65 includes freight of Rs. 15.16 per tonne).

BHILAI

7.4.4. Bhilai obtains its supplies of unwashed and washed coals from the same source as Rourkela. Variations in Coal price at Bhilai are given in Table-28.

TABLE—28

Variation in Bhilai Coal Price

Item	Coal Cost (Base 1961=100)	
	1960-61 Rs./tonne	1964-65
Raw Coal	22.07	124
Washed Coal	30.74	137
Washed coal in total intake	38%	83%
Average Ash content	17.9%	17.91%

The per cent of washed coal in the total intake has increased gradually over the years and about 83 per cent is in the washed form. It is also noted from Table 28, that a steady increase in the proportion of washed coal is needed to keep the average ash content at a steady, albeit, high level.

DURGAPUR

7.4.5. Durgapur's supplies of raw coal come from nearby coal fields and washed coal from its captive washery. Further the washery being inside the plant the additional cost due to handling of washed coal is not necessary. This accounts for the fact that the increase in coal cost of 16 per cent during 1961—65 as given in Table 29, is the lowest among the five steel plants.

TABLE—29
VARIATION IN DURGAPUR COAL PRICE

Item	Coal Cost (Base 1961=100)	
	1960-61	1964-65
Raw Coal	Rs/tonne 30.77	116
Washed Coal	50.60	91
Washed coal in the total intake	31%	49%
Average ash content	N.A.	19.71%

N. A.—Not Available.

7.4.6. The prices have come down in 1964-65 and this may be due to the pattern of grades purchased particularly lower grades with low prices. The percent of washed coal in the total intake has increased from 31 per cent to 49 per cent in 1964-65.

7.5. The analysis of the coal cost in the various steel plants shows that the prices of coal, both washed and unwashed as charged to the coke ovens, have risen progressively and the increase was mainly on account of the increase in the prices of coal and freight. Another striking feature is the progressive increase in the use of washed coal by all the steel works except IISCO where it is small. The steel plants have over the years been able to maintain consistency in the ash content in the total intake only by a progressive increase in the use of washed coal.

In other words, this confirms that metallurgical coal quality is gradually deteriorating. Coal is a wasting asset and to be realistic, it has to be assumed that in the years to come the declining trend in quality will continue. The use of washed coal to a greater extent than now would be inescapable in the circumstances. The operation of coal washeries therefore assumes considerable importance in the economy of the steel industry. This is examined in the following pages.

7.5.1. Another factor contributing to the coal cost in the steelworks (as well as in the washeries) is that the coals received have been one or two grades lower than the grades for which payment was made to the suppliers on the basis of the grading made by the Coal Controller. This point was very strongly brought to the notice of the Committee by the managements of the steelworks which they visited. Not only did this result in overpayment and consequent loss to the Steel Plants; equally importantly, the decline in quality which this signified affected the efficiency of washery and coke oven operation. To overcome this, Government had devised the scheme of joint sampling of coals at destination under which the producers who agreed to joint sampling at destination would receive a stipulated premium over the notified price. It seemed common experience that only a few of the coal producers (and the less important ones at that) had agreed to joint sampling; the more important among the producers were hostile to the scheme. The steelworks complained that they had continuously to make overpayments which involved substantial losses.

7.5.2. The Committee discussed these matters with the Coal Controller. The Coal Controller admitted that there were variations between the grades at which supplies were invoiced and the grades as actually supplied. He said that down-grading of a seam on the basis of inspection by his Organisation often took as long as about a year, due particularly to the long time taken for the completion of analysis by the Central Fuel Research Institute. During this period, the collieries demanded and received payments for supplies from the seam at higher grade. He said that joint sampling by suppliers and consumers could be either at the colliery and or at the destination. The collieries preferred testing at the colliery end. There were several difficulties in agreeing to this apart from the fact that there were as many as 144 collieries and 180 actual loading sidings and joint sampling at the colliery end would have required an army of inspecting staff on the part of the consumers involving enormous expense. On the other hand, sampling at the destination was admittedly more convenient as the points for sampling were far fewer. There was however pronounced reluctance on the part

of the collieries to agree to joint sampling at destination. The collieries have doubts about the present sampling procedures which had been standardised by the Indian Standards Institution. The Coal Controller informed the Committee that he had appointed a Technical Team to review the sampling procedures and to evolve one which should be acceptable to all concerned. Meanwhile, as this problem of grades and quality was a pressing one, it had been suggested that the steel industry and the collieries should get together and evolve an agreed arrangement for ensuring supplies at guaranteed qualities and at agreed prices. The Coal Controller explained that while this move implied relaxation of price control over coking coal, his Organisation would continue to retain the control of distribution of coking coal in the interest of conservation of this scarce resource. In other words, they would continue the linkage of particular collieries to particular washeries and steel plants and stipulate the quantities to be supplied from different sources.

7.5.3. It seems to the Committee that the device of direct arrangement between the suppliers and the steel industry without relaxation of distribution control is fraught with serious consequences and that the result could well be that the steel industry would be left completely at the mercy of the suppliers. The Committee would rather think that, in the short term, an answer would have to be found by the Government to the baffling problem of joint sampling so that the losses to which the steel industry are now put to are reduced. We feel that it is urgently necessary to speed up the process of regrading of seams. The relatively small investment in the testing facilities which this might involve would be negligible when compared to the significant losses the steel plants now incur. Secondly, having regard to the manner in which attempts at introducing joint sampling at destination have been frustrated so long in the absence of a legal backing for this measure, there would seem to be an imperative need for statutory action to give the necessary legal support to joint sampling. We would strongly recommend that Government should arm itself with statutory powers to make joint sampling at destination obligatory on the suppliers.

7.5.4. The Committee consider that these are at best short term palliatives. They would attach far greater importance to the working out of a long term and durable solution to this vexed question of coking coal supplies to the steel industry in right quantities and at the right qualities. There seems to have been appreciation all round that unless the coking coal mines undertake development designed to increase their output and efficiency there would be a crisis in supplies towards the close of the Fourth Plan period when new steel making capacity would

come into existence. We have serious doubts whether the small collieries which form the bulk of the 144 mines in the private sector are capable of development in a manner which would secure increased output at levels of productivity which would ensure economic cost. We gather that the output per man shift in our mines is on the average 0.5 tonnes against much higher figures attained in countries abroad. Any future development of the coking coal mines should significantly improve our present productivity in this sector and prevent wastage of this scarce resource. If, as it seems, the faith in the capacity of the small collieries to develop on proper lines is somewhat misplaced, no time should be lost in evolving a practical design for development in view of the rising demand for coking coal and its rising prices. The amalgamation of the mines and their development in the public sector is one solution which has been strongly urged by some members. There could be other alternatives but we at the moment cannot elaborate any. In any event, it would appear that there are advantages in strengthening the association between the NCDC and the steel plants in the matter of coal supplies by extending the scope of NCDC's operation. We would emphasise that in our view this is the paramount problem confronting the steel industry which calls for immediate attention in the context of keeping down steel costs.

(B) COAL WASHERIES

8.1. The Committee examined the operation and efficiency of three public sector washeries, viz., Dugda, Bhojudih and Kargali, on the basis of their data summarised in Statement No. XIII. We recommend the following measures which should help reduce the cost of washed coal.

8.1.1. **Washery Operation.**—The capacity of the washery plant should be utilised fully. Even though, at present, it might appear that these washeries will have to work on restricted capacities due to demand being less for washed coal, this is likely to change in the course of next 2 years when the existing steel plants' expansions will be more or less complete.

8.1.2. **Coal Supply.**—Utilisation of the full capacity of the washery would depend on the regularity in the supply of raw coal and disposal of washed coal. At present, there are difficulties in the supply of raw coal. Hindustan Steel washeries are not equipped to receive a big number of covered and unsuitable wagons. As this has not been regulated by the Railways in the past, there have been many occasions when the washery operation was affected due to inflow of a large number

of covered and unsuitable wagons. Similarly, the offtake of washed coal will have to be regulated by the regular and timely supply of box wagon rakes by the Railways.

8.1.3. Use of inferior coal.—At present, the production of raw coal is related to the demand from the washeries. As higher capacities are aimed at the washeries, there will have to be a progressive increase in the production of suitable coals. The mining operations cannot be stepped up at short notice and this would take a little time before enough raw coal is available to the washery. During the intervening period, they may have to supplement it by taking inferior coals.

8.1.4. Norms.—Depending upon the quality of coal available for each washery and depending upon the washability characteristics of the coal supplied to the various washeries, it would be necessary to fix some norms for operation, indicating the ash percentage at which the washed coal will have to be produced and the yield percentage which will have to be achieved. The operating cost in a washery can be calculated in terms of per tonne of raw coal or per tonne of washed coal. The operating costs in the washery are not directly influenced by the quality of raw coal or by the yield of washed coal even though both would influence the operating cost per tonne of washed coal. As the quality of raw coal may be changing from time to time in the same washery and would be different from washery to washery, it would be more appropriate to fix the operating cost per tonne of raw coal. This figure would be comparable from washery to washery even when they are washing different types of coals. This figure in the case of Dugda comes to Rs. 5.22 per tonne, in the case of Bhojudih Rs. 3.04 per tonne and in Kargali Rs. 4.53.

8.1.5. Joint Sampling.—At present, the washeries are paying a higher price for the actual coal quality they receive. This difference in price is on the average about Rs. 2.50 per tonne. This could be reduced by making joint sampling at destination obligatory for all suppliers.

8.1.6. Transport.—On the raw coal that is supplied to the washeries the Railways are charging the minimum distance freight of Rs. 6.50 per tonne plus siding charges. As this is a short distance movement, this rate appears to be rather high and, if possible, a concessional rate should be obtained for this movement. In a study that was carried out by HSL about 2 years back it has been found that a wagon takes less than 3 days to complete a round trip from the time of supply to a colliery for loading, its movement to the washery and back to the same or

another colliery for loading. This would get further reduced when Dugda works at higher capacity necessitating more regular movement of trains. Taking the average earning of a wagon as Rs. 22 to 23 per day and taking 3 days for a round trip a reasonable rate would be Rs. 3 per tonne of raw coal.

8.1.7. Siding Charges.—Bhojudih, Dugda and Patherdih washeries have been provided with the needed facilities to receive, deal with and despatch the trains. So additional siding charges do not seem to be applicable in addition to freight charges. This should show a reduction of about a rupee per tonne of washed coal.

8.2. Cess.—Cess is being collected on the raw coal supplied to the washery as well as on the washed coal despatched. The same coal is thus subjected to payment of cess twice. To obviate this double payment, we would recommend that cess should be charged only on the washed coal despatched. It seems this would require **statutory action**. In the meanwhile, it has to be ensured that the cess collected on both the raw coal received and the washed coal despatched is not paid out in such a manner that the refund of the excess collection to the steel plants at a future date is rendered difficult. Indeed large amounts might even now be due to the steelworks on this account.

8.2.1 As an immediate step, therefore, we would suggest that the railways who now collect the cess may be instructed to hold back the collection made on the raw coal supplied to the washery instead of distributing it to the coal organisation. These organisations may be paid only amounts realised on washed coal despatched from the washeries. The steel plants can then periodically settle their refund claims with the Railways.

8.3. Middlings.—This is a problem with all the washeries and if it is not disposed off, washeries will have to dump this material at extra cost. Non-disposal, in effect, would increase the cost of washing. Therefore, every attempt should be made to realise as much as possible by the regular disposal of middlings from the washeries. Middlings produced in Dugda and Patherdih have fuel value of about 9000 B.Th.U per lb. The middling-cum-rejects at Bhojudih would have about 6000, to 6500 B.Th.U. per lb. If the fuel cost at a power house is to be controlled, the rate for the middling will have to be less as the distance to the power house increases. Thus if the power house is at a reasonable distance, of 150 to 300 km, Dugda and Patherdih can realise a price commensurate with thermal values whereas in the case of Bhojudih the material cannot bear any more transport cost. This material cannot be consumed for brick making or for ordinary

uses because of the high ash content. This can be consumed only in a modern power house equipped for utilising the material. This would be the case also with Kathara and other new washeries of N.C.D.C. and Dugda II which are to come.

8.3.1. In the case of Bhojudih the middling-cum-reject is about 15 percent and if the material is sold at Rs. 6 to 7 per tonne, it would reduce the cost of washed coal by a rupee or so. In the case of Kathara and Dugda II, where 50 percent would be middling-cum rejects, the saving would be about Rs. 3.00 to Rs. 3.50 per tonne of washed coal.

(C) IRON ORE

9.1. The consumption of iron ore by the steel plants in India rose from 1.5 million tonnes in 1948-49 to 12.69 million tonnes in 1964-65. TISCO, IISCO, Rourkela and Bhilai have captive mines. Durgapur is procuring its entire requirements from outside sources. Both IISCO and Rourkela also purchase some of their requirements.

TISCO

9.1.1. The iron ore consumption in TISCO rose from 1.5 million tonnes in 1948-49 to 3.1 million tonnes in 1964-65.

9.1.2. The average iron ore cost per tonne in 1948-49 and its trend in subsequent years are given in Table 30.

TABLE 30

TATAS PRICES FOR IRON ORE

(BASE 1948/49=100)

	1948/49	1954/55	1960/61	1964/65
	Rs. tonne	%	%	%
Own	4.67	150	231	243
Purchased	..	..	*	..

(*Note.—Purchased ore used in 1960/61 at Rs. 14.16 per tonne. The proportion of usage of purchased ore was 15 percent).

9.1.3. The average cost of mining in their captive mines rose from Rs. 4.67 per tonne in 1948-49 to Rs. 11.33 in 1964-65, showing an increase of 143 per cent. The cost of mining of iron ore at different mines owned by TISCO in 1948-49 and the percentage increase for selected periods are given in Table 31 below :

TABLE 31
VARIATION IN TISCO IRON ORE MINING COST

Mining cost index (1948/49 = 100)

Mines	1948/49	1954/55	1960/61	1964/65
	Rs/tonne	%	%	%
Noamundi	4.45	167	198	228
Badampahar mines	5.47	140	268	31
Gorumahisani	4.46	138	321	106
Joda East	..	..	Rs. 8.32 (Actual)	103
Sulaipat	5.56	179	411	95
Khondbond Mines	..	..	..	..
Average Raising cost for all mines	4.65	159	232	244

9.1.4. In 1964/65, the lowest mining cost amongst TISCO mines was attained in Joda East mines (Rs. 8.60 per tonne) which was Rs. 2.73 less than the average cost of all mines. This is indeed a challenging figure in regard to the cost levels obtaining in mechanised iron ore mines generally. Perhaps the conditions in Joda East are such that mining operations could be more compactly organised than in other mines generally. Nevertheless, Joda demonstrates what efficient and coordinated mechanised mining could achieve. We would, therefore, commend its cost levels as the cost targets the other mechanised mines should set before themselves.

IISCO

9.2. The iron ore consumption at IISCO rose from 0.8 million tonnes in 1958-59 to 1.8 million tonnes in 1964-65. The

proportion of own and purchased iron ore is as shown in Table 32 below :

TABLE 32
SOURCE OF ORE

Year	Mined		Procured	
	%		%	
1954/55	.	46	.	54
1960/61	.	78.9	.	21.1
1961/62	.	61.7	.	38.3
1962/63	.	70.9	.	29.1
1963/64	.	70.6	.	29.4
1964/65	.	64.6	.	35.4

9.2.1. The cost per tonne of iron ore in IISCO in 1955 and the trend in subsequent years is as given in Table 33 below :

TABLE 33
VARIATIONS IN IISCO'S IRON ORE PRICES
(1954/55 base = 100)

	1954/55	1960/61	1964/65
	Rs. tonne	%	%
Own	7.89	110	177
Purchased	5.83	220	306

(Note.—Own mining costs have shown lesser variations compared to purchased ore).

9.2.2. The cost of ore mining from Gua and Manoharpur, the captive mines, in 1954/55 and trend for subsequent years is given in Table 34 below :

TABLE 34
VARIATIONS IN IISCO IRON ORE MINING COST
Mining cost index (Base 1955 = 100)

	1954/55	1960/61	1964/65
	Rs. tonne	%	%
Gua	7.81	97	151
Manoharpur	8.72	155	239

9.2.3. The major increase in (i) Gua, is in respect of stores, royalty and cess, services and general works expenses and in (ii) Manoharpur, on account of labour, stores, royalty and cess and general works expenses. Increase in the output from the mechanised mines may reduce the cost per tonne and substitution of purchased ore by mined ore may reduce the overall cost per tonne of ore to the plant.

ROURKELA

9.3. Rourkela Steel Plant has its iron ore captive mines at Barsua. About 75 percent. of the iron ore requirements during 1962/63, 1963/64 and 1964/65 were met from the captive mines and remaining by procurement from outside. The cost per tonne of iron ore procured and mined and percentage increase for the following selected period is given in Table 35 below :

TABLE 35

VARIATIONS IN ROURKELA IRON ORE PRICE

Variation in Ore Cost (Base 1961 = 100)

	Purchased Own	
	Rs. tonne	Rs/tonne
1960/61	24.45	..
1964/65	116	..
	(Rs. 26.3 per tonne)	

9.3.1. The average cost per tonne was Rs. 16.14 in 1964/65 (excluding freight). Barsua mines did not work to full capacity and the deficit in raising was made good by procurement from outside. The raisings in Barsua mines for the last three years is given in Table 36 below:

TABLE 36

(Figures in thousand tonnes)

1962/63	1963/64	1964/65
965	962	831

9.3.2. The mining cost per tonne in Barsua for 1962/63 and 1964/65 is given below :

1962/63	.	.	.	.	.	.	.	.	Rs. 18-14
1964/65	.	.	.	.	.	.	.	.	Rs. 15-21

9.3.3. The major elements of cost increase are labour, stores and spares and depreciation. Increased production will reduce the incidence of all these elements in the Mines.

9.3.4. Barsua Mine was scheduled to produce iron ore with an average Fe content of 59/60 percent in accordance with the Project Report submitted by American Mining Consultant M/s. J. W. Woormer and Associates. The iron ore produced from the mine has been of the order of Fe 58 percent. The silicon alumina ratio in the ore which was supposed to be 1 : 2 as per the project report could not be maintained due to the occurrence of laterite ore at depth. Rourkela has been purchasing high grade ore averaging 63/65 percent. Fe content and having a silica alumina ratio of the order 1 : 2 and 1.5 : 2 from the M.M.T.C. to maintain proper blast furnace burden by blending.

9.3.5. Full utilisation of the installed capacity of the mines, beneficiation of the ore and full utilisation of the fines in the sintering plant may help reduction of the cost of iron ore to Rourkela. The gradual reduction, if not total elimination of purchased ore, may also reduce the overall cost of iron ore at Rourkela. Only then could Rourkela claim to have availed of the maximum advantages of an ore based plant.

9.3.6. During our visit to the Rourkela Steel Plant, our attention was drawn to the absence of adequate ore bedding and blending arrangements at Rourkela. This seems to have been one of the principal defects in the planning of the Rourkela million tonne steel works. We gather that there are significant variations in the quality of iron ore received at Rourkela both from the captive mine at Barsua and from market sources. Even under controlled mining, such variations cannot be altogether eliminated. Ore bedding and blending arrangements help in evening out such fluctuations in quality so that a charge consistent in quality and size could be secured for the blast furnaces. This in turn stabilises hot metal quality. In the absence of adequate bedding and blending arrangements, therefore, Rourkela seems to be experiencing difficulties in keeping down variations in hot metal quality. We were informed that steps were in hand to rectify this and would commend speedy action in this respect.

BHILAI

9.4. Bhilai obtains its entire iron ore requirements from Rajhara. The consumption of iron ore in Bhilai rose from 1.7 million tonnes in 1960/61 to 2.7 million tonnes in 1964/65. The cost per tonne of iron ore in Bhilai and percentage increase for a selected period is given below in Table 37:—

TABLE 37
VARIATIONS IN BHILAI IRON ORE PRICE
Variation in Ore Cost (Base 1960/61=100)

	1961	1963	1964	1965
	Rs. tonne	%	%	%
Price	9.19	123	101	105

9.4.1. With the increase in production, the mining cost did not vary substantially. Increased raisings have helped Bhilai to keep the raisings costs more or less uniform except in manual mines, where the increase has been mainly on account of transport and loading expenses. There is difference of about Rs. 3.50 per tonne between mechanised and manual mines in 1964/65 and substitution of the manual mining by mechanised process may help to secure reduction in mining cost per tonne. As fines are costed along with the lump ore raised, greater utilisation of fines by way of sintering or pelletising as may be practicable would bring down the cost.

DURGAPUR

9.5. Durgapur Steel Plant has no captive mines and the entire iron ore requirements are met by purchase from outside as in Table 38 below:

TABLE 38
VARIATIONS IN DURGAPUR IRON ORE PRICE
(Base 1961=100)

Quality	1960/61	1964/65
	Price (Rs.)	Price (%)
L. G.	11.71	114
H. G.	15.25	111
B. H. Q.	11.02	..

(L. G.—Low Grade; H. G.—High Grade; B. H. Q.—Banded Haematite Quality).

9.5.1. The average cost of iron ore increased by 18 percent in 1964/65 compared to 1960/61 and this is mainly due to prices.

9.6. General

9.6.1. **Purchased Ore.**—The dependence by the steelworks on Purchased Ore is essentially a transient phase. In their own interests, the steelworks are bound to restrict this to the minimum and to become self-sufficient in regard to their iron ore requirements at the earliest.

9.6.2. **Own Ore.**—It has already been indicated that mechanised mines should work towards the cost levels attained at Joda by fuller utilisation of equipment and improved productivity.

9.6.3. **Railway Freight.**—A comparison of the rail freight charges in U.S.A. and India worked out by NCAER is given in Table 39 which speaks for itself :—

TABLE 39

A COMPARATIVE ANALYSIS OF USA & INDIA RAILWAY FREIGHT RATES FOR IRON ORE

Range	Port	U.S. Rail freight from Lower Lake Ports		Comparable freight India	
		Average * distance	Freight Rs./tonne **	Before Surcharge Rs./tonne	After Surcharge Rs./tonne
Marquette . .	*Marquette	29	3.91	4.60	4.83
Marquette (West)	„	40	4.33	4.60	4.83
Gogebic . .	Ashland	72	4.14	6.00	6.30
Marquette . .	Escanaba	104	5.95	7.60	7.98
Mezabi & Vermilion . .	Duluth	125	6.10	8.30	8.71
Menominee . .	Escanaba	142	5.95	9.00	9.45
Gogebic . .	„	282	6.90	13.20	13.86

(*) U. S. Bureau of Mines 1956—Materials Survey Iron Ore, Table IX-10, page IX 40.

(**) Pickands and Mathur Co.—Analysis, 1960

9.6.4. Prima facie there appears to be a case for revising the existing freight structure for handling iron ore from mines to steel plants. Moreover, economy in railway freight could also be achieved by adopting close circuit movements whenever possible.

(D) LIMESTONE

9.7. Limestone consumption by the steel plants increased from 0.6 million tonnes in 1948-49 to 3.56 million tonnes in 1964-65, plant-wise consumption being as in Table 40 below :—

TABLE 40

LIMESTONE CONSUMPTION IN DIFFERENT PLANTS

Limestone Consumption—Million tonnes

Plant	1949	1961	1965
TISCO	0.47	—	0.84
IISCO	0.16	—	0.43
ROURKELA	—	0.67	0.99
BHILAI	—	0.19	0.79
DURGAPUR	—	0.19	0.51

9.7.1. IISCO and Durgapur have no captive mines for limestone and obtain their entire requirements by purchase from outside sources. TISCO has limestone deposits but bulk of its requirements is procured from external sources. Both Bhilai and Rourkela have limestone captive mines, Nandini for Bhilai, and Purnapani and Satna for Rourkela.

TISCO

9.8. The cost per tonne of limestone from 1948-49 and the subsequent increase for the selected period of TISCO, is given below in Table 41.

TABLE 41

VARIATIONS IN TISCO LIMESTONE PRICE

Limestone Price Index (Base 1948-49=100)

Cost elements	1948-49	1954-55	1960-61	1964-65
	Rs./tonne	%	%	%
Price	4.97	132	214	302

IISCO

9.8.1. The net cost per tonne of limestone procured by IISCO in 1954-55 and the subsequent increase for selected period is given below in Table 42.

TABLE 42

VARIATIONS IN IISCO LIMESTONE PRICE

Limestone Price Index (Base 1955=100)

Cost elements	1954-55	1960-61	1964-65
	Rs./tonne	%	%
Price	5'96	134	244

DURGAPUR

9.8.2. The cost per tonne of limestone procured by Durgapur for 1961-62 and the subsequent increase is given below in Table 43.

TABLE 43

VARIATIONS IN DURGAPUR LIMESTONE PRICE

Limestone Price Index (Base 1962=100)

Cost elements	1961-62	1964-65
	Rs./tonne	%
<i>Limestone (Low Grade)</i>		
Price	14'149	88
<i>Limestone (High Grade)</i>		
Price	15'577	97

9.8.3. It will be seen that in the case of all the plants who have been procuring limestone from outside sources the trend of price has been more or less uniform.

BHILAI

9.8.4. The cost per tonne of limestone in Bhilai for 1961 and subsequent increase is given below in Table 44.

TABLE 44
VARIATION IN BHILAI LIMESTONE PRICE

Limestone Price Index (Base 1960-61 = 100)		
Cost element	1960-61	1964-65
	Rs./tonne	%
Price	11.38	141

9.8.5. The raisings for the same period is given below in Table 45.

TABLE 45

(In thousand tonnes)

	1960-61	1964-65
Mechanised	39	541
Manual	633	253
TOTAL	672	794

9.8.6. The raising cost of limestone in Nandini for machanised and manual processes for 1960-61 and 1964-65 is given below in Table 46.

TABLE 46

	1960-61	1964-65
	Rs./tonne	Rs./tonne
Mechanised	7.58*	15.05
Manual	7.58*	8.04

*Average for mechanised and manual mines.

9.8.7. The main elements of increase in the cost of mining are (i) labour, (ii) stores, (iii) miscellaneous and general expenses. In addition to the raising cost, Rs. 5.42 per tonne

9.8.8. The ratio of mined and procured limestone by Rourkela is given below in Table 47.

TABLE 47

	Mined	Procured
	%	%
1960-61	Nil	100
1964-65	84·17	15·83

9.8.9. The limestone mined for 1961-62 to 1964-65 is given below in Table 48.

TABLE 48

(In thousand tonnes)

	1962	1963	1964	1965
Satna	66	121	126	101
Purnapani	152	217	229	212

9.8.10. The cost per tonne of limestone mined in Purnapani and Satna for the first year of production and the subsequent increases are given below in Table 49.

TABLE 49

VARIATION IN ROURKELA LIMESTONE PRICE

(Limestone Price Index—Base 1961-62=100)

Mines	1961-62	1964-65
Purnapani	Rs./tonne 20.06	% 108
Satna	6.76	155

9.8.11. The cost of raising limestone has increased both in Purnapani and Satna. The raising cost alone has increased by 8 per cent in Purnapani and 55 per cent in Satna. The increase in Purnapani is mainly on account of transportation and siding charges and depreciation. The increase in Satna is mainly on account of salaries and wages, rent and taxes and depreciation. The fixed charges may be reduced, if production is increased in both the quarries. If the procurement of limestone from external sources is dispensed with and substituted by own raisings the overall cost per tonne of limestone would also come down.

(E) FERRO—MANGANESE

10.1. During our visit to the steelworks, our attention was also drawn to the recent price escalations in regard to ferro-manganese. It would appear that the supply of ferro-manganese to the steel industry from market sources is practically controlled by an association of the important producers of ferro-manganese, who appear to have demanded and secured a higher price for ferro-manganese supplies during the negotiations last year. While we would not wish to express any views on the question whether the price rise was reasonable or otherwise, we would underline the fact that in the matter of supply of important raw materials to the steel industry where the suppliers are so strongly organised as to rule out free and fair competition, Government might have to keep a close watch and control over the prices in the interests of keeping steel costs down. In this context the Committee are glad to note that Government have brought ferro-manganese and other ferro-alloys within the purview of the Essential Commodities Act.

(F) GENERAL

10.2 In the foregoing paragraphs we have underlined the central importance of raw material costs in the cost structure of steel. It has been shown how raw materials consumption has registered a striking increase in response to increasing steel production. We gather that even at the existing levels of demand, the procurement of the raw materials needed by the industry at the most economic cost is becoming a major worry for steel plant managements. The increase in demand the projected rise in steel production would induce, would make matters worse unless there is a planned approach designed to secure raw material production and supply at economic rates. We have been told that there are certain factors which militate against this end. The administration of the statutes relating to mining leases seems to be one such factor. Instances have been cited where, in the

grant of mining leases for iron ore, manganese, etc., the State Governments have preferred applicants with no stake in the steel industry to the actual users, viz., the steel plants. Indeed, we were told of an extreme case involving the rejection of the application of a steel plant for mining lease which was entitled to a lease under the rules. We strongly feel that having regard to the substantial investment of public funds in this industry, there is need for a more constructive and sympathetic attitude in such matters on the part of the State Governments and other authorities concerned towards the requirements of the industry.



CHAPTER IV

PLANT OPERATION

11. In the previous chapter the impact of raw material costs on cost of production of steel was examined. In this Chapter, we deal with some of the more important aspects of plant operation from the point of view of productivity and costs.

11.1. It seems to us that in the area of blast furnace operation, our plants are poised for large gains in productivity which would have their impact on costs. Indeed, in this Department, there have been remarkable and rapid gains in productivity in advanced countries like Japan, U.K., Soviet Union, etc. in recent years. Firstly, there has been a global trend towards the installation of furnaces of large capacities. In line with this trend, the average size of blast furnaces in our country has also been going up with the installation of large capacity furnaces and is now about 900 cu.m. This does not compare unfavourably with the average volume of blast furnace in Japan, USSR, etc. When our Fourth Plan expansion programmes are completed, the average blast furnace volume would go up still further. On the other hand, we have still considerable leeway to make up in the matter of productivity (defined as output per day in tonnes per cu.m. of furnace volume). The average furnace productivity in India is 1.079 tonnes per cu.m. This compares unfavourably with modern attainments elsewhere. For example, furnace productivity in Japan ranges between 1.3 to 1.6 per cu.m. Similarly, in USSR, U.S.A. and U.K., it is not quite unknown to have furnace productivities of about 1.5 tonnes per cu.m. or more. We have reason to hope that although our raw material quality and particularly the relatively lower fixed carbon content of our coke act as constraints on the attainment of high productivity, substantial gains in this respect are within the realms of possibility.

11.1.1. The technical prescriptions for the attainment of this objective of improved productivity are well known. They have been spelt out in a Report on the subject submitted to Government last year by the Nijhawan Committee. Among these are improved raw material preparation, installation of blending arrangements which would ensure a consistent charge, improved technological practices like injection of auxiliary fuels, constant humidity blast, etc. The specific improvements to be carried out have, of course, to be decided by each plant management after

an appraisal of the various alternatives available. But we believe strongly that positive steps to attain higher blast furnace productivity should be taken by all concerned without further delay as this is one area where significant results leading to cost reduction seem possible.

11.1.2. Intimately linked with the improved increase in blast furnace productivity is the question of securing a decrease in our coke rate. Cost-wise also this is very important. Because of the poor quality of Indian coking coal, coke rate in Indian furnaces is very high as compared with international standards. The coke rate in our plants varies from 840 to 1000 kilos/tonne of hot metal, the average being about 900 kilos/tonne. This compares unfavourably with coke rates, sometimes as low as 500 to 600 kilos per tonne of hot metal, attained in modern furnaces of similar capacity abroad. The fixed carbon content in Indian coke is about 75 per cent as against 85 to 90 per cent in other countries. It has been estimated that a decrease in fixed carbon in coke by 1% will increase the coke consumption by about 15 to 20 kilos/tonne. A 10% decrease in fixed carbon content will require an additional 150 kilograms of coke per tonne of hot metal. Thus on an equivalent fixed carbon basis the average Indian coke rate may be assumed at about 750 kilos/tonne of hot metal. Our coke rate is further increased due to the presence of excess alumina in ore because the high alumina in the ensuing slag require a higher operating temperature needing additional coke in the burden. In these circumstances, the present coke rate cannot be brought down to values attained in foreign countries. But with better performance with existing facilities as well as the adoption of improved technological practices, the coke rate can be substantially reduced. A target of about 750 kilos/tonne of hot metal could be considered as attainable with Indian coke of 23/24% ash content.

11.1.3. Metallurgical coking coal is a scarce and rapidly dwindling raw material which should be preserved and utilised in the most effective manner possible. Thus a high coke rate in iron production not only pushes up the cost of iron production but results in the use of a scarce resource which we can ill afford to fritter away. Here again, there is no set prescription which all could adopt. Each plant has to work out the techniques most beneficial to it from a techno-economic standpoint. The problem is so important both from the cost as well as the conservation point of view that we strongly urge that each plant management should analyse critically their blast furnaces operation vis-a-vis the coke rate, formulate concrete proposals for rapid reduction in the existing rates to the recommended target value and attempt to achieve this in the shortest possible time.

11.1.4. Our studies indicate that there is scope through efficient operation for a reduction in the down-time of our blast furnaces. Under the best international practice, we believe a furnace availability of about 98% can be regularly obtained. This is exclusive of major relinings between campaigns. The data given in Statement No. XIV indicate that furnace availability in Indian plants varies from 90% to 98% with an average of 94.7%. If the average down-time of 5% could be reduced to about 2% in line with international practice, about 10 days extra production i.e. production of about 2,00,000 tonnes per year would result. We would recommend that the managements should keep a close watch on furnace down-time and maximise furnace availability.

11.2. As in the case of blast furnaces, we believe that there is significant scope for improvement in steel melting shop productivity. In Statement No. XV the performance of open hearth furnaces in our plants (which contributed as much as 41% of our total steel production during 1964-65) is set out along with comparable data for Japan, U.S.A. and U.S.S.R. These data indicate that the production in tonne/hour in our open hearth furnaces is rather low. No doubt, there are handicaps like high silicon content in our hot metal and the poor quality of lime which stand in the way of the attainment of increased productivity. Technological innovations like the use of basic roofs and oxygen lancing practice, have, however, begun to be applied in our steel plants. With their application, it should be possible for our furnaces to attain the level of productivity recorded by similar open hearth furnaces abroad.

11.2.1. Heat consumption is a major element in the operating cost in steel melting shops. Here again, there would seem to be scope for improvement in our Plants. In Statements XVI, XVI-A and XVI-B the comparative performance data in this respect is set out in plants in India, Japan and U.S.A. It is seen from this that even the best performance recorded in India falls short of the consumption rates achieved in Japan. While, due to high silicon content in our hot metal, it may not be possible to achieve such low figures as Japan attained, our average performance is capable of significant improvement.

11.2.2. The availability of open hearth furnace in our Plants for 1964-65 is given in Statement No. XVII. We are given to understand that the national average in furnace availability is 90 per cent in U.S.A. and 93 per cent in U.S.S.R. In exceptional cases, some shops in these advanced countries have been reported to give as high an availability as 96 to 97 per cent.

Our current performance marginally falls short of these standards is capable of improvement through better operation and maintenance. This would also reduce cost through increased output.

11.3. In operating charges in the steel melting shops, the consumption of moulds and base plates is an important item of cost. The average consumption rates in our steel plants is 32 kilos/tonne for moulds and base plates. Against this, the average consumption recorded in Japan is 20 kilos/tonne of moulds and base plates. Similarly in U.S.S.R., the consumption rate of 18 to 23 kilos/tonne of moulds and base plates has been recorded. There would seem to be scope for reduction in the usage rate in this respect through better upkeep.

11.4. The most specialised department in a steel works is the rolling mills. It is also the most expensive complex in a steel plant. Having regard to large capital investment in this department, capital related charges constitute the principal item of cost. It is axiomatic therefore that the output from rolling mills should be maximised so as to keep costs down. This is the context in which the operation of the modern rolling mills in our steel works and in particular the mills in the HSL plants at Rourkela, Durgapur and Bhilai should be considered. At the present time, all the primary mills are rolling on an average at the rate of 1 million tonnes of ingot per year. The primary mills at Rourkela, Durgapur and Bhilai are designed for higher output rates. At the end of the current expansion of these plants, these mills would roll at the rate of 1.8 million ingot tonnes at Rourkela, 1.6 million ingot tonnes at Durgapur and 2.5 million ingot tonnes at Bhilai. With this, the costs at these mills would naturally come down. In other respects too, operating these mills at optimum capacity would help improve their performance in the matter of electricity consumption, heat consumption per tonne of steel etc. This would be also true of other mills like the hot strip mill and cold rolling mill at Rourkela, rail and structural mill at Bhilai. Billet mill at Durgapur, etc., to mention only a few units. It is clear that it will not be appropriate to appraise the present performance of these mills when they are not called upon to give of their best. For this reason, we have not commented in detail on the subject. We would, however, like to state that the need to maximise the production from these highly expensive mills is so paramount from the cost stand point that any constraints in this direction should be eliminated. For instance, during our visit to the Durgapur steel works, we observed the accumulation of large stocks of ingots and were informed that this was the consequence of inadequate soaking pit capacity. We understand that steps are in hand to augment soaking

pit capacity and would advise expeditious action. We have cited this instance only to underline the need for removing these factors which limit optimal rolling mill utilisation by making suitable balancing investments.

11.5. The efficient operation of coke oven By-Product plants has an important bearing on cost of production of steel and on the working results of steel companies. In the HSL plants the investment in by-product facilities is relatively much more substantial than it is in TISCO and Indian Iron. For HSL plants, therefore, the working results of the operation of these plants are of added importance. Besides, these by-product plants, particularly those in HSL, are designed to yield products of considerable value to the economy.

11.5.1. We start with ammonium sulphate. At present all plants except Rourkela are equipped to recover ammonia from coke oven gases as ammonium sulphate, an important fertilizer much needed in the country. At the present hour, increased fertilizer production is a crying need. In this view, we would urge that the production of ammonium sulphate in the plants should be maximised. The ammonia yield varies between the different plants and there is scope for improvement in this yield in some of the plants. We would urge that all plants should aim at attaining an average production of ammonium sulphate amounting to 1 per cent of the dry coal charge.

11.5.2. Another aspect to which our attention has been drawn is the relatively high consumption of sulphuric acid in some of the plants. This consumption which is as high as 0.9 tonne per tonne of ammonium sulphate in some plants could be reduced by about 15 per cent through efficient operation; a value of 0.77 tonne of sulphuric acid per tonne of sulphate has normally been obtained at Bhilai. We would emphasize this in view of the fact that we are dependent on imports for meeting the sulphur requirements.

11.5.3. We believe certain units of by-product plants are not being operated at present. For instance, the recovery of phenol is not being carried out at Bhilai and Rourkela due to the inability to operate the phenol rectification plant at Rourkela. As this is a valuable by-product which is being imported at present, we would urge that this unit should be put into operation at an early date.

11.5.4. We believe that the steelworks have been unable to operate the benzol recovery facilities due to fluctuating demand for benzene. This seems to us to be a matter calling for

coordinated action on the part of the Ministry of Technical Development and Supply which handles the industries consuming benzol products and the other Ministries concerned.

11.6. In the foregoing, we have suggested certain productivity norms for the operation departments. A factor of central importance to the attainment of those productivity norms is the availability of the right type of technical personnel who are receptive of new technical ideas and innovations. Indian experience with the modern steel making facilities like the LD convertors, the hot strip mill, the cold rolling mill, etc., is in the nature of things recent. It is, however, gratifying that our young technicians have risen to the occasion and in many instances grappled with technical problems with considerable ingenuity. All the same, further improvements in productivity at the marginal level would call for exacting standards of technical expertise. For the attainment of this objective, it would be necessary to strengthen the technical personnel in the operation departments in quality by intensive training.

11.6.1. Till recently we had a sellers market in steel and this obscured such aspects like less than adequate emphasis on quality of the products, the reluctance to develop sections and categories in line with the consumers' demand, on the part of the steel plants. The slackening of demand has brought these aspects into greater prominence. The attitude induced by the sellers market seems however to persist. We hear of the accumulation in the steel plants of certain sizes and categories of steel not much in demand while some of the products for which there is keen demand are not being rolled and supplied by the steel plants. We are confident that the steel industry would increasingly show a greater sensitivity to consumer needs and shed some of the rigidity which characterises the present situation.

11.6.2. Another aspect which has been brought pointedly to our notice is that there is no arrangement for exchange of practical experience in the technical field amongst the various steelworks in the country. We feel that nothing would stimulate innovation and improvement other than a periodical getting together of Superintendents, Assistant Superintendents and even foremen of a particular department like cokeoven, blast furnace, steel melting shop, etc., drawn from the various steelworks so that they could exchange their experiences. We gather that there is such a scheme of liaison between TISCO and Indian Iron and we would suggest that this arrangement should embrace the public sector steelworks as well.

11.7. During our visit to the steelworks, we were struck by the enthusiasm and initiative of operatives. Many had bright suggestions for technical improvement. Possibly not all such suggestions are of practical significance. Nevertheless, we feel the management should keep the door open for these ideas and accept and implement those which have a practical value. We gather that there is already a system of rewarding suggestions accepted by the management which has started yielding results. We would therefore commend that this should be extended in scope so as to encourage the operatives.

11.8. The Committee discussed the subject of research and development work in the iron and steel industry. The Committee noted that steel plants of HSL at Durgapur, Rourkela and Bhilai each had a separate Research and Control Laboratory which had been well equipped and staffed under the Chief Metallurgist of each Steel Plant to undertake research and development work for their respective Steel Plants. The Durgapur Alloy Steel Plant of HSL also had a separate Research and Control Laboratory. The TISCO and IISCO also have their own Research and Control Laboratories, which were well-equipped and staffed. The Committee further noted that under the CSIR, there were the National Metallurgical Laboratory and the Central Fuel Research Institute which were fully equipped and staffed and also had integrated Pilot Plants for the Iron and Steel Industry for whom these Laboratories have been doing considerable research and development work. The Committee advised the formation of an Iron and Steel Research Board to coordinate the research activities and programmes of all the Research and Control Laboratories of the steel plants both in the Public and Private Sectors and including the National Metallurgical Laboratory and the Central Fuel Research Institute of the CSIR, etc. Future steel plants such as, Bokaro Steel Plant and other projects during the Fourth and Fifth Five Year Plans could also join the proposed Iron and Steel Research Board in due course. The proposed Iron and Steel Research Board would then identify and farm out Research projects of short-term and long range nature to individual Research Laboratories whilst in general following the broad pattern of the British Iron and Steel Research Association in the United Kingdom (BISRA).

CHAPTER -V

12. PERSONNEL COSTS

12.1. When it was decided to expand steel production in India, it was thought that not only would this meet the expanding internal demand for steel but there would be considerable scope for exports as Indian steel would be the cheapest in the world. It was estimated that the lower costs of Indian steel would arise from the close proximity of the plants to good quality ore as well as lower labour costs. In the matter of labour costs, of late there has been considerable concern about lower labour productivity and the higher incidence of labour costs per tonne of product indicating that the initial edge in costs may have been lost already. The Committee's main concern, therefore, was to locate areas of personnel costs which have scope for reduction. Whatever is said in this report in regard to productivity of Indian labour in the steel industry is not intended to reflect the comparative proficiency of Indian labour as such, compared to their counterparts in more developed countries. It is well-known that Indian labour in general can be considered as equal to or in some respects better than its counterparts elsewhere in regard to skill and proficiency. Comparison of productivity is intended to reflect the effectiveness of labour utilisation in the steel industry in India and the incidence of costs arising therefrom.

12.2. Costs on personnel whether on an overall basis or department-wise can be compared if there is comparability also in respect of equipment and technology, product-mix, hours of work, extent of work done through outside agencies such as contractors or extent of purchases of parts or services including power, the state of maintenance of the equipment, the rate at which the plant units are worked in comparison to their capacities depending on demand factors, etc. If all these factors are taken into account, no two plants can be considered sufficiently alike to allow comparison of productivity on an absolute basis.

12.3 In order to compare the performance of the five steel plants in the field of manpower and personnel costs which would give an idea as to the scope for reduction in cost, the Committee examined :

- (a) The absolute numbers of personnel in different related units of the various steel plants,

(b) The productivity indices in terms of output of ingot steel per man-year, and

(c) Costs on personnel per unit of output.

If technological and other differences are not taken into account, comparisons of absolute numbers of personnel could provide some indication of the performance of the plants only when the plant units are of identical size. Otherwise, the total numbers of personnel employed cannot be used profitably. Indices of productivity and unit costs on the other hand could be fairly good indicators of cost performance provided the other factors mentioned above are given due consideration.

12.4. The total production in ingot tonnes, total employment, employment in major departments, labour productivity and unit costs for the five plants are given in Statement No. XVIII attached.

12.4.1. As far as employment in Works departments are concerned, it will be seen that the productivity in terms of annual ingot production in tonne per employee ranges from 55 to 72. Absolute indicators of productivity in plants abroad are not available but it is known that in U.K., during 1963-64, the total ingot production was around 24.7 million tonnes and the total number of employees on the pay roll of the industry was 306,000. This gives a productivity index for the U.K. steel industry as a whole of around 80 annual ingot tonnes per employee. Such an index for the whole of the industry might not however provide a comparable basis for assessing the performance of the Indian plants because the U.K. pay roll figures might include several categories of personnel who may not have been included in the calculations of productivity of the Indian plants. Specific employment and production figures for some selected plants abroad are available, particularly in respect of more modern plants, and these figures indicate the range as in Table 50 below.

TABLE 50

Country	Labour productivity in ingot tonnes per man-year
U.S.A.	150-250 (in some cases more)
U.S.S.R.	135-170
Japan	116-187
Czechoslovakia	104-111

The USSR plants indicated above do not include coke ovens as part of the integrated steelworks. These figures on individual modern plants indicate that the Indian plants have still a long way to go to reach the levels of productivity indicated above. Even if a labour productivity figure of 100 ingot tonnes per man-year had been achieved in respect of Works departments, then the comparative position would have been as in Table 51 below:—

TABLE 51

	Bhilai	Durga- pur	Rour- kela	TISCO	IISCO
Estimated employment with productivity at 100 ingot tonnes per man-year	11,430	9,720	8,000	18,940	10,260
Works employment in 1963-64	17,207	13,555	13,777	29,452	14,678

These figures may provide a rough indicator of the extent of excess manning.

12.5. It is not possible to compare the relative strength of different categories of personnel used in the Indian plants or in different departments with those in steel plants abroad mainly because the basis of classification of such personnel is not available. But the figures in Statement No. XVIII indicate that even as between the steel plants in India there are considerable differences in the total strength of workers in various departments.

12.5.1. Output per man-year in all departments upto and including the ingot stage of production worked out on the basis of a weighted index covering coke ovens, blast furnaces and steel melting shops varies between 210-404 tonnes between the five steelworks. The cost per tonne upto this stage varies between Rs. 8.24 to 20.41. This inter-plant variation seems to be very significant, but may be partly accounted for by differences in the organisational pattern where maintenance and service departments in one plant are more decentralised compared to another plant. The productivity and output figures mentioned above do not include a proportionate allocation of manpower and costs on central maintenance and service departments used by these production departments. When all the works departments are taken together, it is found that the extent of variation between one plant and another has been narrowed down. The productivity variation is between 55-72 tonnes per man-year and the

cost variation is between Rs. 43.10 to Rs. 57.55. These figures may be more indicative of the actual variations in personnel costs and productivity performance than the figures relating to departments upto the ingot stage given at the beginning of the paragraph. Nevertheless, the inter-plant variations which these figures indicate are significant.

12.5.2. Even when all personnel costs including those in the Administration and Township Departments are compared, the cost variations between the plants is about the same as when the production and service departments alone are taken into account. However, it is seen that the major differences exist in the work-force of administrative departments.

RECOMMENDATIONS

12.6. In the field of manpower and personnel costs, the possibilities of reducing costs exist both under existing operational conditions as well as at the stage of each expansion. There seems to be a general feeling that the possibilities of improving the productivity and cost performance under existing operational conditions are very limited, and, therefore, improvement in productivity and cost performance can only be achieved with each expansion. The Committee came to the view that this is not so. Considerable possibilities for improving the cost performance exist both under existing operational conditions as well as with each expansion. Action is needed in the following areas:

12.6.1. It is seen that in most of the HSL plants, manpower has been steadily increasing even during years when no additions to the plants capital equipment has been undertaken or no significant increase of production with the existing set of equipment has been achieved. These increases in HSL are fairly significant and indicate the need for a tight control over manning. In TISCO and IISCO, for a single additional sanction to their approved standard force, powers are reserved at the highest levels of the Company and, therefore, the work force in these plants is fairly stable and indicate a tight control. This is all the more important in HSL because most of the HSL employees are at the lower stages of their scales of pay and would be earning their increments to the higher stages in subsequent years.

12.6.2. It would also seem desirable to establish norms and standards of productivity and personnel costs on a department-wise or activitywise basis so that departmental performance can be assessed and pressures for increasing the work force withheld.

12.6.3. Early steps should be taken for standardising the classification of personnel by departmental group and by activities so as to facilitate standardisation of accounts classification and comparability of performance as between plants.

12.6.4. The incidence of overtime payments per tonne of ingot steel varies considerably. In Durgapur, it is as high as Rs. 10-11; in Rourkela Steel Plant, it is between Rs. 5-6; in Bhilai it is between Rs. 3.5-4; in IISCO Rs. 3-4 and in TISCO it is Rs. 1.5-2. It was also found that in some departments, the overtime cost is as much as 50 per cent of the cost on basic pay and sometimes twice as much as paid on production incentives. This indicates that not only the statutory limits of overtime work are being exceeded steadily in some of these plants but also lack of control over overtime authorisations exists. The level to which powers for authorising overtime has been delegated may have to be revised upwards and/or strict ceilings or limits of overtime work can be set and gradually reduced over a period of time. This would reduce significantly cost per tonne on overtime work.

12.6.5. It was also found that in some plants, the practice of obtaining work through job contracts or through contract labour was significant. Some of the plants and departments which have the highest incidence of costs on contract work were also units where productivity of departmental labour itself was low indicating that there was considerable scope for increasing the productivity of departmental labour and reducing costs on contract work.

12.6.6. There are major differences in the cost per ingot tonne in the different plants on the centralised services and maintenance departments. Some of these differences may lie in the extent to which spare parts and services including power are brought from outside sources; but the Committee feels that this could not account for the total extent of the differences. It is most likely that some of the centralised departments are not being utilised to the extent possible and/or are overmanned. Therefore, their productivity in terms of their contribution of steel production is low. Greater attention to the proper utilisation and manning of these departments is necessary. This is an area which could benefit from more detailed industrial engineering studies.

12.6.7. Considerable variations exist between the five plants in regard to manning of their administrative departments. Although there may be good reasons for these variations, the manpower in these departments in IISCO seems to be comparatively very much less. This would make it worth while to

study the procedures followed in these departments and the manner in which work is regulated. One of the reasons advanced as far as HSL plants are concerned in regard to the larger numbers of clerical personnel in administrative departments was the nature of accountability involving greater work load. While this might be correct to some extent, the Committee feels that this will not entirely account for the major differences in manning. The possibility of revising the procedures, making the activities more officer-oriented rather than clerk-oriented and tightening the controls in regard to sanctions of additional clerical and non-production personnel might be the answer to this problem.

12.6.8. In view of the fact that the per capita labour costs are likely to increase over the years rather than decrease because of the automatic adjustments in the dearness allowance which has been permitted by the Wage Board, the need exists for not only the plant managements to control their manpower and not permit of additions, but also to improve productivity of labour by rationalisation of workforce over the years even in plants which are not expanding. It should be possible for managements and the unions together to agree to adjust the labour force and reduce heavy surpluses where they exist and employees who may be so affected need not be unemployed but may be absorbed through attrition in the existing units. For this purpose, it is realised that the industrial relations climate in the plants should be such as to permit of such agreements and the State and the Central Labour authorities to endorse and support all reasonable actions for reducing personnel costs in view of the fact that cost per employee will be steadily increasing.

12.7. Over and above these steps which can be taken to improve productivity and personnel costs under existing operational conditions there are major possibilities of effecting improvements in both these fields with each expansion of the steel plants. Absolute indicators of the productivity of steel plants in terms of output of ingot steel per man-year for comparable plants is not possible to obtain because of the variations in technology and conditions of work discussed earlier. The comparative figures supplied to the Committee in regard to the productivity of the Indian steel plants and of the steel plants abroad can only be general indicators of the difference. Allowing for a certain margin of variations in these figures because of differences between the plants, it has to be admitted that the productivity of the steel industry in India is fairly low. It should be possible to raise the productivity in respect of works personnel from the present level of 55-70 ingot tonnes per man-year and aim at a productivity index of 125 ingot tonnes per man-year and

above in each of the plants. In order to achieve this, the following steps seem necessary :—

12.7.1. Need for adequate pre-planning of the manpower requirements and the standard force in as great a detail as possible before each expansion is authorised. This pre-planning would take into account the need for adjusting upward the productivity level of the plant.

12.7.2. It should be possible for a plant which is not expanding to share its experienced personnel with new plants being set up in India and through this process of attrition the older plant may be able to improve its productivity and personnel costs and the new plant gain experienced personnel.

12.7.3. Coordination is also needed between the steel plants and other expanding industries for the development of personnel from the steel industry particularly from those departments where they are considered to be in excess. A proper system of exchange of information and coordination regarding such excess personnel should be developed.

12.7.4. The construction activities in each of the plants should be organised in such a manner that pressures do not develop at the close of each expansion to regularise large numbers of construction workers in addition to the plant work-force required for the expanded units. Central and State Governments should assist in withholding such pressures.

12.7.5. While the need exists for careful pre-planning of the work force, care should also be taken that men are not recruited very much in advance of the actual commissioning of the plant units and a proper phasing of training and recruitment activities is undertaken.

12.8. In addition to the steps mentioned above in regard to the possibilities of improving productivity and personnel costs both under existing operational conditions as well as with each expansion, it should not be forgotten that productivity increases can take place with technological innovations and rationalisation in methods and processes. Systematic attempts should be made to improve methods, processes and procedures not only in process departments but also in maintenance and service departments as well as administration departments. These improvements are likely to account for major improvements in productivity and personnel costs and the need for giving attention to this area cannot be over-emphasized.

CHAPTER VI

13. INVENTORY

13.1. Inventories do not enter directly into the cost of production except by way of interest on working capital. Inventory carrying costs are also not directly reflected anywhere. Nevertheless in view of its importance, in efficient and economical working of the Plants, the Committee also directed its attention to this important area. A Sub-Committee was appointed to collect data, examine and report on the subject.

13.1.1. The Committee noted that inventories were generally high in all the Steel Plants.

13.1.2. The Committee was of the opinion that whilst normal cost control methods would focus the attention of the management in reducing consumption of raw materials, stores, spares, etc. to the desired norm, the building up of inventory has to be checked by—

- (a) Budgetary control—the top-management laying down financial ceilings and norms and containing the purchase budget within these norms,
- (b) by exercise of quantity controls, namely, scientific determination of inventory levels taking into consideration inventory carrying cost, consumption rates, lead time and re-ordering level.

13.1.3. Both these controls have to be applied concurrently, the former by the top-management and the latter by the departmental heads concerned with indenting, provisioning, ordering and acquiring of inventories.

13.2. As far as the broad ceilings are concerned, the Committee was of the opinion that the level of working capital should be kept within about 25 to 30 per cent of the cost of sales (Works cost). Similarly the aggregate inventory level should be between 35 to 40 per cent of the cost of sales (works cost). In terms of consumption also, the present turnover of inventory varies from 9 to 11 months between the

five steel plants. A turnover ratio of 0.5 to 0.6, i.e. an average of between 6 to 7 months of consumption would be a good though difficult target to be aimed at in the present context.

13.3. The application of scientific methods of inventory control seems to have made slow progress because of a number of factors, namely, the very large range and number of items in a Steel Plant, the absence of reliable data regarding consumption norms in the newly started plants and the long lead time for both indigenous and imported materials and spares. In the present situation, however, when indigenous manufacturing capacity has increased in range and volume and the norms of consumption are better established, it should be possible to apply these techniques progressively. We find that the high value items ('A' category items in terms of ABC analysis) which constitutes the bulk of the value of inventory are confined to relatively fewer items compared to the total number of items in the inventory. It should, therefore, be possible to apply stricter inventory control techniques to these selected items as a first measure.

13.4. Even in the case of consumable stores as distinguished from spares, the level of stock varies widely, mostly on the high side. It is appreciated that even the establishment of indigenous capacities for specialised items, such as, conveyors, larger castings and engineering goods may not necessarily reduce lead time sufficiently, in the beginning. But it should improve from year to year. Refractories and conveyor belts are good examples where indigenous capacities are available but supply time is extremely low. Early planning and ordering would be necessary in such cases.

13.5. **Spares.**—All Steel Plants carry extremely high stocks of spares, in terms of consumption. The level of spares inventory, however, cannot be directly linked with annual consumption value alone. The Committee suggests, therefore, that a ceiling between 3 to 4 per cent of the original plant and equipment cost should also be observed. For most plants spares inventory constitutes about 18 to 20 per cent of the total value of the inventory and therefore the heaviest items in which the attention is to be focussed. Almost all of this is imported. The reason for this high inventory seems to be similar in all cases, namely, a heavy build up of spares at the beginning of the operation of new units. In the absence of data regarding wastage rate in Indian conditions, of unfamiliar equipment; greater reliance is naturally placed on the foreign supplier's recommendation.

13.5.1. The value of spares inventory is so high because it also includes a large bulk of slow moving spares which are in the nature of 'risk insurance' against unforeseen break-downs.

13.6. The following steps are suggested by the Committee for tackling this problem of spares :—

- (i) Pooling of spares may not be practicable at the present stage because of the different specifications and makes of the equipment in the existing plants but for the future at least this problem could be avoided if indigenous equipment is made to common basic designs.
- (ii) Dependence on import, which is the main cause of over-stocking has to be progressively removed by planning educational orders in the country in a systematic manner. The coming up of HEC should make a vital difference.
- (iii) Production in the plant workshops must be maximised. There will be need for replacements which may not be economical for outside agencies to undertake. These will have to be manufactured in the plant workshops, leaving bulk orders for execution by outside agencies.
- (iv) To achieve the above drawings and material specifications have to be prepared systematically over a period, as special programme.
- (v) The problem of 'risk insurance' spares which have already accumulated and will be further acquired for new units will however not be solved by the above steps. The Committee suggests that a specialised team consisting of operating and maintenance engineers as well as inventory analysts should examine the question in detail in each plant and advise the management where risks must be covered and where a calculated risk can be taken in the case of break-down and possible stock out. Otherwise every time a new imported equipment is to be installed and commissioned it will start with a handicap of heavy initial spares.
- (vi) Continuous movement analysis is necessary to identify the slow-moving items and systematic action taken over the years for their disposal.

13.7. It has been brought to the attention of the Committee that accumulation of inventories does occur in the Steel Industry and special effort and drive to reduce inventories become necessary from time to time. The example of internationally reputed steel company was quoted who had during such drive during 1962 reduced their inventories from 793 million dollars to 740 million dollars within a period of one year. Such a drive appears necessary in the steel plants today. Caution will, however, have to be exercised during such disposal duly considering calculated risks against stock out and replacement costs as opposed to inventory carrying costs.



CHAPTER VII

14. CAPITAL COST

14.1. Capital-related charges have a very significant impact on the cost of production of steel. In the case of HSL plants, the depreciation and interest charges account for 25.6 per cent of the total cost of production for the year 1964-65. In the case of TISCO and IISCO, whose plants are older and were constructed when the capital cost was much less, the corresponding percentages are, of course, significantly lower.

14.2. There is a general impression that the capital cost of our new steel plants is excessively high, being higher than those for plants in other countries. There are several reasons inherent in the present Indian situation which account for this high cost.

14.2.1. Till now we have been dependent on imports for steel plant and equipment and the necessary technical know-how for erection and engineering works. Large amounts of foreign exchange were therefore required for setting up the plants. The arrangements had to be made with 'tied' credit. Since supplies and engineering work were mostly arranged on a turn-key basis from the countries extending the necessary credit, competition was limited and the prices paid were much higher than would normally have been payable by inviting global tenders.

14.2.2. From the beginning, the HSL plants made a provision for additional built-in capacity to be utilised at a later stage for expansion. This provision was made in the lay-out itself, power, gas, water and drainage works and in the rolling mills. The capital cost thus incurred remained as idle investment, adding to the depreciation and interest charges without yielding corresponding additional output.

14.2.3. Since green field sites were opened to set up the new steel plants, the construction of large modern townships became an unavoidable liability. For the same reasons of additional capacity, as mentioned in the preceding para (14.2.2), land far in excess of requirements was acquired. Heavy cost was thus incurred on these townships amounting to about Rs. 60 crores for the HSL steel plants.

14.2.4. Such costs are not normal features of steel plants in other countries.

14.3. An additional contributory factor has been the unusually long time taken to complete the construction of the plants which added to the capital cost by way of interest during the construction period in the expenditure on supervisory personnel. Neither construction nor production kept pace with the targets fixed.

14.3.1. Although nothing can now be done to reduce the capital costs of the existing plants, these expenditures being by their very nature "fixed", the Committee thought it worthwhile to examine them. The objective in view was that any cost-reducing measures that come out from our study would be useful for further expansion programmes and in the setting up of the new steel plants.

14.4. We examined the costs of all the important items that constitute the total block cost of steel production. For the HSL steel plants, million tonne stage, the capital block per tonne of ingot is in the range of Rs. 2000-2300, while the combined figure for the different plants after expansion would be in the range of Rs. 1400-1600. For the expansion programmes of the older plants, TISCO and IISCO, the capital block is Rs. 1200-1300. The major items of capital cost are: (a) plant and equipment, including erection, (b) structurals, (c) refractories, (d) civil engineering, (e) customs, freight and insurance and (f) township.

14.5. The relative importance of the major items can be indicated by their proportion in the total capital block per tonne of ingot. Broadly speaking, plant and equipment, structurals and refractories, all together, constitute about 54 per cent of the total; civil engineering between 12 and 19 per cent and township cost between 6 and 8 per cent. Of course, these costs varied from plant to plant and differed in respect of initial plant and expansion programme.

14.6. It must be pointed out here that customs duty on imported equipment, at the present rate, forms a substantial proportion of the total block cost, accounting for about 18 per cent. Before the present rate was introduced last year, the duty was much less: customs and freight together constituted about 5 to 10 per cent of the block cost.

14.7. As regards measures to reduce the capital cost, the Committee came to the conclusion that there is scope to bring it down, but it is limited under the present conditions of foreign

less in line with the provision that the steel companies were obliged to make for depreciation on a straightline basis under the Indian Income Tax Act. The Income Tax Rules was amended in 1964 providing for additional depreciation to cover third shift working in industries by way of incentive for increasing output. As applied to the steel industry, this change made it obligatory on the steel plants to provide for depreciation at about 6.8 per cent on a straight line basis as against 5 per cent earlier. By virtue of the process requirements, the majority of the units in a steel plant like blast furnaces, steel melting shops, rolling mills, etc., are obliged to work three shifts on a continuous basis. While, therefore, the additional depreciation allowed under the amendment to the Income Tax Rules 1964 was meant as an incentive to industries, it has become an additional burden to the steel industry and inflates the cost of production of steel by adding to capital related charges. In view of the fact that the earlier provision of 5 per cent depreciation on a straightline basis adequately met the depreciation needs of the steel industry, we recommend that, as a measure of cost reduction, the earlier position obtained before the 1964 amendment to the Income Tax Rules may be restored in respect of this industry.

14.8. In the course of the examination of capital costs of the plants, Shri D. S. Nakra, pressed his view that the conventional concept of the block cost of industries should now be radically changed and that the price structure of steel should be altered accordingly. In the price structure, according to Shri Nakra, no account has been taken of the portion paid by the consumers which forms the greater part of the block cost. In that view, if from the block structure the consumers' contribution is deducted, then the prices would be calculated at a lower level. Some other members strongly contested this view. After discussion, the Committee felt that the question of price structure was beyond the purview of the Committee as it was the work of the Tariff Commission. The Committee took into account the price structure as has been fixed by the Tariff Commission since 1948. The Chairman, however, agreed to forward the views of Shri Nakra to the Steel Ministry for their consideration.

CHAPTER VIII

15. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

(1) We have covered the period 1948/49 to 1964/65 in our study. During this period, the selling prices of various categories of steel in our country rose faster than the corresponding ex-works prices. Relatively steeper increases in Excise Duty, Equalised Freight and surcharge (during the Equalisation Fund period) contributed to this trend. The differentials between selling prices and ex-works prices are more now than in 1948-49. This steeper increase in the elements like Excise Duty, Equalised Freight and surcharge forming part of the selling prices have tended to strengthen the popular impression that our steel is excessively costly. (Chapter I—para. 1.3.3.).

(2) A comparison of our selling prices with prices of imported steel would not be a comparison of like to like. A valid comparison would be between our ex-works prices with the ex-works (Home) prices in foreign countries. Such a comparison has been made. This discloses that even today our ex-works prices, such as they are, do not compare too unfavourably with similar internal prices (Home prices) abroad. However, it is a matter of concern that our ex-works prices have risen faster than the corresponding prices elsewhere. We thus seem to have lost the advantage we once had as one of the cheapest steel producing countries in the world. This conclusion is reinforced by the fact that the present level of ex-works prices in India is related to the capital block per tonne of saleable steel capacity (Rs. 1176 per tonne) which is admittedly unrealistic in relation to the capital block for the three HSL plants which is about Rs. 2500 per tonne of saleable steel capacity at the million tonne stage and about Rs. 2000 per tonne of saleable steel capacity at the end of current expansions. (Chapter I—para 1.3.7.).

(3) A general study of price trends in the country discloses that the ex-works prices of steel have risen faster than the average ex-factor prices of several other commodities. Also the ex-works price of steel has risen faster than the general level of prices. (Chapter I—para 1.3.8).

Cost Analysis :

(4) Between 1948/49 and 1960/62, the average retention price fixed by Government for untested categories increased from Rs. 248 to Rs. 522.5 per tonne, i.e., an increase of Rs. 274.5 per tonne or 111 per cent. Of this increase, overheads constituted about 27.5 per cent, ingot excise duty 17 per cent and the works cost 55.5 per cent. The increase in overheads was almost entirely related to the increase in the gross block. Increase in the cost of fixed assets per unit of capacity has thus contributed importantly to the increase in the ex-works prices. This is the trend in other steel producing countries as well. (Chapter II—para 2.2.).

(5) To identify the important cost raising elements in Works Cost, an analysis of the Works Cost of ingot at Tatas is made for the period 1948-49 to 1964-65, which discloses an increase of about Rs. 151 per tonne of ingot (158 per cent). Out of this total increase, the portion relating to gross materials (including fluxes) formed about 68 per cent and operating charges 45 per cent. However, there was an increase in the credit for scrap gas etc., at 13 per cent. Further, of the total increase of Rs. 151 per tonne, the portion attributable to price and expense factors represented about Rs. 146 (97 per cent and usage factor about Rs. 5 (3 per cent). Increase in materials cost is thus the largest single item among the cost raising factors. Further, of this increase in material cost, the bulk was accounted for by coal, iron ore, limestone, and dolomite; Coal being the most important cost raising material. It should be emphasised here that an important contributory factor leading to the steep increase in the cost of coal is the deterioration in the quality of coal which has compelled the steel plants to use an increasing proportion of washed coal resulting in higher cost. (Chapter II—para 3.1.1. to 3.2.1).

(6) Fuel and power, Stores and services and labour constitute the three important cost raising factors in so far as operating costs are concerned. In regard to labour, wages per tonne or in got have practically doubled during the period 1948/49 to 1964/65. (Chapter II—para 3.3.2).

(7) The methods adopted in working out costs by the different steel plants vary. This frustrates any attempt at a meaningful inter-plant comparison of works cost of ingot steel in the present system of uniform selling prices and uniform ex-works prices, there is a paramount need for establishing uniform accounting system in all the steel plants so that a proper

comparison of costs could be made in the future. We strongly urge that steps to have this evolved should be initiated by the Government. Despite the limitations imposed by the differing cost accounting procedures, a comparison of the Works Cost of ingot at the five steel works for 1964-65 has been made and this discloses that the ingot cost ranges from Rs. 227 to Rs. 247 per tonne. (Chapter II—Section C—para 4.1. and 5.12).

(8) A representative analysis of the impact of Government levies on the Works Cost of ingot steel shows that the increase on account of these levies contributed as much as 24 per cent to the increase in the Works Cost of steel between 1948-49 and 1964-65. The impact of Government levies has thus been a significant cost raising factor. (Chapter II—Section D—para 6.2 and 6.3)

Raw Materials :

(9) Although with technological innovations the unit consumption of raw materials per tonne of ingot steel is on the decline, the prices of materials have risen at such a rapid rate that their increase has more than offset the decrease in raw materials consumption. Although the prices of raw materials have increased all over the world, the rise in India is much higher than in other steel producing countries. The analysis of the coal cost in the various steel plants shows that the prices of coal, both washed and un-washed, as charged to the coke ovens, have risen progressively, and that the increase was mainly on account of the increase in the prices of coal and freight. Another striking feature is the progressive increase in the use of washed coal by all the steel works except IISCO where it is small. The steel plants have over the years been able to maintain consistency in the ash content in the total intake only by a progressive increase in the use of washed coal. As there is no prospect of an improvement in the quality of metallurgical coal, the use of washed coal to a greater extent than now seems inescapable. The efficient operation of coal washeries therefore assumes considerable importance in the economy of the steel industry. (Chapter III—para 7.5).

(10) Another factor contributing to the coal cost in the steelworks (as well as in the washeries) is that coals received by them have been one or two grades lower than the grades for which payments are made to the suppliers on the basis of the grading made by the Coal Controller, resulting in substantial overpayments. This situation needs immediate rectification. We have recommended that the process of regrading which now

reportedly takes as much as a year should be considerably speeded up. Further, having regard to the manner in which attempt at introducing joint sampling at destination have been frustrated so long in the absence of a legal backing for this measure, it is recommended that Government should arm itself with statutory powers to make joint sampling at the destination obligatory on the coal suppliers. (Chapter III—para 7.5.1 to 7.5.3).

(11) The Committee attach the greatest importance to the working out of a long term and durable solution to this vexed question of coking coal supplies to the steel industry. We have urged that no time should be lost in evolving a practical design for developing of coal production in view of the rising demand for coking coal and the rising prices. The amalgamation of coal mines and their development in public sector is one solution. It would appear that there are advantages in strengthening the association between N.C.D.C. and the steel plants in the matter of coal supplies by extending the scope of N.C.D.C's operations. (Chapter III—para 7.5.4).

Coal Washeries :

(12) As indicated already, the efficient operation of coal washeries assumes considerable importance in the economy of the steel industry. Operation of the washery at full capacity is indispensable for keeping costs down. With the anticipated increase in demand for washed coal, this should be possible. Utilisation of full capacity on the washery is also dependent on the regularity in the supply of raw coal and the disposal of washed coal. To achieve this, the Railways have to ensure a regulated supply of wagons to the washeries. (Chapter III—Washeries—8.1.2).

(13) As the first step towards the establishment of standard cost for washery, norms should be fixed for the operation of the washeries indicating the ash percentage at which the washed coal will have to be produced and the yield percentage will have to be achieved. (Chapter III—Washeries—8.1.4).

(14) On the raw coal supplied to the washeries, the Railways are charging the minimum distance freight of Rs. 6.50 per tonne plus siding charges. As this is a short distance movement, this rate appears to be rather high and there seems to be a case for concessional rate for this movement. It is further suggested that additional siding charges should not be levied on the washeries in view of the fact that the central washeries have provided themselves with the necessary siding facilities. (Chapter III—Washeries—8.1.6).

(15) It is suggested that the double collection of cess on raw coal and on washed coal despatched should be avoided and that the cess should be collected either on raw coal or on washed coal despatched. (Chapter III—Washeries—8.2).

(16) The importance of regular disposal of middlings from the washeries in washery economics is underlined and the urgency of taking in hand projects for setting up thermal stations which should consume washery middlings in close proximity to the washery is stressed. (Chapter III—Washeries—8.3).

Iron Ore :

(17) Attention has been drawn to the mining cost attained in Joda East Mines of Tatas in 1964-65 which is the lowest amongst the mechanised captive mines attached to steel plants and it is suggested that although the mining conditions in Joda East may be more favourable than elsewhere, the Joda cost level could be set as the target for other captive mines. (Chapter III—Section C—para 9.1.4).

(18) It is shown that the increase in output from the captive mechanised mines and the substitution of purchased ore by ore from own mines which this would make possible, would help reduce the overall cost per tonne of ore to the steel works. The need for maximising the output from the Barsua mines so that the heavy investment in this mine is put to better use than at present is stressed. The urgency of installing ore bedding and blending arrangements at Rourkela is also stressed. (Chapter III—para 9.3.6).

(19) It is indicated that the utilisation of fines to a larger extent than now would have salutary impact on the cost of iron ore to the steel works. (Chapter III—Para 9.4.1.).

(20) A comparison of railway freight rates on mineral ores in India and USA is made and it is suggested that *prima facie* there appears to be a case for revising the existing freight structure for handling iron ore from mines to the steel plants. It is further recommended that by adopting close circuit movement wherever possible, economy in railway freight could also be achieved. These recommendations apply to limestone with equal force. (Chapter III—para 9.6.3 and 9.6.4).

Ferro-Manganese :

(21) In the context of the recent escalation in Ferro-manganese prices, the Committee has urged that Government should keep a close watch and control over the prices of the

raw materials needed by the steel industry in the interest of keeping steel costs down. (Chapter III—Para 10.1).

General :

(22) The Committee gather that even at the existing levels of demand, the procurement of the raw materials needed by the steel industry at the most economic cost is becoming a major problem for the steel plant managements. In view of the importance of ensuring supply of raw materials at economic rates to the steel plants, we have urged a planned and integrated approach to the problem. We have referred to certain difficulties in the grant of mining leases experienced by the industry and have urged on more constructive and sympathetic attitude in such matters on the part of the State Governments and other authorities concerned towards the requirements of the industry. (Chapter III—para 10.2).

Plant operation :

(23) The Committee have urged that positive steps to attain higher blast furnace productivity should be taken by all concerned without further delay as this is an area where significant results leading to cost reduction seem possible. (Chapter IV—Para 11.1.1).

(24) The need for reducing the coke rate is stressed and a target of about 750 kg/tonne of hot metal considered as attainable with Indian Coke of 23 to 24 per cent ash content. It is felt that there is scope for improvement in the level of productivity attained by our steel melting shop furnaces. The need for reducing heat consumption in these furnaces and improving their availability is also urged. (Chapter IV—para 11.1.2).

(25) We have emphasized the need to maximise production from highly expensive rolling mills and by removing those factors which limit the optimum utilisation of such mills by making suitable balancing investments. (Chapter IV—11.4).

(26) The importance of efficient operation of coke oven by-product plants has been stressed with a few specific suggestions in this direction. Having regard to the leeway we could make up in the matter of equipment productivity, it is suggested that arrangements should be made to enable exchange of practical experience in the technical field amongst the operatives in the various steel works. (Chapter IV—para 11.5).

(27) To coordinate the research activities and programmes of all the research and control laboratories of the steel plants both in the public sector and in the private sector and of the National

Metallurgical Laboratory and the Central Fuel Research Institute, the Committee advises the formation of an Iron and Steel Research Board patterned broadly on the British Iron and Steel Research Association in the United Kingdom. (Chapter IV para 11.8).

PERSONNEL COSTS

(28) The Committee note that in most of the HSL plants, man-power has been steadily increasing even when there is no addition to capacity. This indicates the need for a tight control over manning. We recommend that norms and standards of productivity and personnel costs on a departmentwise or activitywise basis should be established so that departmental performance could be assessed and pressures for increasing the work force held. (Chapter V—Para 12.6.1).

(29) Step should be taken for standardising the classification of personnel by departmental groups and by activities so as to facilitate standardisation of accounts classification and comparability of performance as between plants. (Chapter V—paras 12.6.2 and 12.6.3).

(30) The incidence of overtime payments in some of the plants gives cause for concern and indicates that not only the statutory limits of overtime work are being exceeded steadily but the control over overtime authorisation is not effective. We suggest that the level to which powers for authorising overtime have been delegated may be reviewed to see if they have to be revised upwards to limit the incidence of overtime payments. (Chapter V—para 12.6.4).

(31) It was found that in some steel works the practice of obtaining work through job contract or through contract labour was widespread. Some of the plants and departments which have the largest incidence of costs on contract work were also the units where productivity of departmental labour was low indicating that there was considerable scope for increasing the productivity of departmental labour and reducing cost of contract work. Our studies indicate that some of the centralised services and maintenance departments are not being utilised to the extent possible and are also probably over-manned. Greater attention to the proper utilisation and manning of these departments could be fruitful source of cost reduction. (Chapter V—paras 12.6.5 and 12.6.6).

(32) Considerable variations exist between the five plants in regard to manning of their administrative departments. We feel that to keep the man power in these departments in check, the

raw materials needed by the steel industry in the interest of keeping steel costs down. (Chapter III—Para 10.1).

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(28) The Committee note that in most of the HSL plants, man-power has been steadily increasing even when there is no addition to capacity. This indicates the need for a tight control over manning. We recommend that norms and standards of productivity and personnel costs on a departmentwise or activitywise basis should be established so that departmental performance could be assessed and pressures for increasing the work force held. (Chapter V—Para 12.6.1).

(29) Step should be taken for standardising the classification of personnel by departmental groups and by activities so as to facilitate standardisation of accounts classification and comparability of performance as between plants. (Chapter V—paras 12.6.2 and 12.6.3).

(30) The incidence of overtime payments in some of the plants gives cause for concern and indicates that not only the statutory limits of overtime work are being exceeded steadily but the control over overtime authorisation is not effective. We suggest that the level to which powers for authorising overtime have been delegated may be reviewed to see if they have to be revised upwards to limit the incidence of overtime payments. (Chapter V—para 12.6.4).

(31) It was found that in some steel works the practice of obtaining work through job contract or through contract labour was widespread. Some of the plants and departments which have the largest incidence of costs on contract work were also the units where productivity of departmental labour was low indicating that there was considerable scope for increasing the productivity of departmental labour and reducing cost of contract work. Our studies indicate that some of the centralised services and maintenance departments are not being utilised to the extent possible and are also probably over-manned. Greater attention to the proper utilisation and manning of these departments could be fruitful source of cost reduction. (Chapter V—paras 12.6.5 and 12.6.6).

(32) Considerable variations exist between the five plants in regard to manning of their administrative departments. We feel that to keep the man power in these departments in check, the

possibility of revising the procedures, making the activities more officer-oriented rather than clerk-oriented and tightening the control in regard to sanctioning additional administrative personnel might be investigated. We feel that the need exists not only for the control of manpower but for the improvement in productivity of labour by rationalisation of work force over the years even in plants which are not expanding. We consider it possible for the management and the unions together to agree to adjust the labour force and reduce heavy surpluses where they exist. (Chapter V—para 12.6.7).

(33) It seems to us that there are major possibilities of effecting improvements both in manpower productivity and personnel costs with each expansion of the steel plants. We consider it possible to raise the productivity in respect of works personnel from the present level of 55 to 70 ingot tonne per man year to a productivity index of about 125 ingot tonne per man year and above in each of the plants. Certain specific steps in this direction are also suggested. (Chapter V—para 12.7).

Inventories :

(34) The Committee noted that inventories were generally high in all the steel plants and felt that there was need to check the build up of inventories both by budgetary control methods and by the exercise of quality controls. (Chapter VI—para 13.1.2).

(35) The Committee was of the view that plant managements should strive to maintain the level of working capital within about 25 to 30 per cent of the cost of sales. Similarly, the aggregate inventory level should be maintained between 35 to 40 per cent of the cost of sales. In terms of consumption also, they would recommend an average target of about 6—7 months consumption against the present level which varies from 9 to 11 months between the five steel plants. (Chapter VI—para 13.2).

(36) We find that the high valued items which constitute the bulk of the value of the inventory in a steel plant are confined to relatively fewer items compared to the total number of items in the inventory. Therefore, we feel that it should be possible to apply strict inventory control techniques to these selected items as a first step in the progressive application of scientific methods of inventory control. (Chapter VI—Para 13.3).

(37) Even in regard to consumable stores, the level of stocks seems to be on the high side but there is hope that with the establishment of indigenous capacity for the manufacture of several of these items there would be significant improvement in this respect. (Chapter VI—para 13.4).

(38) In regard to spares also, the Committee noted that the steel plants carry high stocks and suggested a ceiling between 3 to 4 per cent of the original plant and equipment cost in this regard. To tackle the problem of spares, the following further steps are suggested :—

- (a) Pooling of spares may not be practicable at the present stage because of the different specifications and makes of the equipment in the existing plants, but, for the future at least, this problem could be avoided if indigenous equipment is made to common basic designs.
- (b) The dependence on imports, which is the main cause for overstocking, has to be progressively reduced by planning educational orders in the country in a systematic manner.
- (c) Production in the plant workshops should be maximised. There will be need for replacements which may not be economical for outside agencies to undertake. These will have to be manufactured in the plant workshops leaving bulk orders for execution by outside agencies. To achieve this, drawings and material specifications have to be prepared systematically over a period as a special programme. (Chapter VI—paras 13.5 & 13.6).

(39) The Committee would recommend a study of the problem of risks insurance spares by a specialised team consisting of operating and maintenance engineers as well as inventory analysts. (Chapter VI—para 13.6).

(40) The accumulation of inventories is a problem which has occurred in the steel industry in other countries too and special drives seem to have been undertaken to reduce inventories from time to time. Such a drive appears necessary in our steel-works today. (Chapter VI—Para 13.7).

Capital cost :

(41) Capital cost, which accounts for about 25 per cent of the total cost of production of steel in the HSL Plants, has a significant responsibility in raising the cost of steel. The capital

cost of the new steel plants and expansion programmes in India is no doubt high as compared with other countries. But several un-avoidable circumstances account for this higher cost. The more important factors have been: (i) high cost of imported plant and equipment on the basis of turnkey arrangements; (ii) heavy customs duty on imported equipment; (iii) provision of unutilised built-in capacity in the plants for later expansion programmes; and (iv) the heavy cost of steel townships. (Chapter VII—Para 14.2).

(42) The Committee found that there is scope for the reduction of capital cost, particularly in respect of the following items: (i) plant and equipment, including its erection; (ii) structurals; (iii) refractories; (iv) civil engineering; and (v) townships. (Chapter VII—Para 14.4).

(43) The Committee makes the following recommendations to reduce the cost of these items:—

(i) Turn-key contracts which have generally been found to be more expensive should, as far as possible, be avoided unless the need for speedy work makes such an arrangement unavoidable.

(ii) The experience of expansion programmes shows that it should now be possible to make a substantial shift to indigenous plant and equipment. Such a shift would be particularly helpful to secure substantial savings in foreign exchange. The country is now well-equipped to design the general lay-out of a steel plant. But we have a big gap in our ability to design equipment. The Design Organisation in the country should be strengthened and encouraged to develop equipment designing.

(iii) Structurals fabrication is another item in which considerable reduction can be achieved. New designs should be developed to reduce the total tonnage of steel for the structurals. Our engineering industry is now capable of developing and implementing such improved designs.

(iv) As regards refractories, already, we are using mostly indigenous manufactures but we should make efforts to rely entirely on our own refractories. Their quality however, needs to be substantially improved.

(v) The civil engineering works which were undertaken as part of turn-key jobs, naturally tendered to be expensive. The foreign contractors actually got the work done from the Indian firms. As we shift from turn-key to non-turnkey arrangements.

we should have direct contracts with the Indian engineering firms for all the construction work in the steel Plants. The number of such firms is, however, limited and conditions should be created to encourage the entry of new organisations in order to ensure competition, which would bring down the cost of engineering work.

(vi) The present situation with regard to steel townships needs to be reviewed. As time passes, the burden of public utility services on the steel plants will go on increasing. The State Governments should be persuaded to share the cost of essential services particularly in view of the fact that they drive considerable revenue from the location of the industry in their areas. (Chapter VII—para 14.7).

(44) As regards future townships, there is a need for improving the lay-out to plan compact towns. The number of quarters per acre can be very much increased and thereby the cost of land as well as utility service reduced. (Chapter VII—para 14.7.8).

(45) We recommend statutory action, if necessary, to secure that the steel industry does not have to make more than such provision for depreciation as they were making before the amendment to the Indian Income Tax Rules, 1964, which introduced an additional third shift depreciation. In the case of steel industry, the third shift is an integral part of the process of steel manufacturing and the incentive for this shift is therefore not called for. (Chapter VII—para 14.7.11).



CHAPTER IX

ROLE OF ADMINISTRATION

16. In the foregoing, we have explored several areas where there seems to be scope for cost reduction and have advanced a number of suggestions. We are convinced that for fruitful and lasting results, the implementation of the recommendations we have made should be reinforced by intimate participation by everyone who has a stake in the industry, whether it be the Government, the higher managements of the steel companies or the large body of men in each steelworks from the General Manager down to the lowest unskilled worker. They must all join in an organised and sustained drive for cost reduction. This means that cost discipline cannot be conceived of as a series of spasmodic effort, but should be looked upon as a part of the very texture of purposive management. We hope that the appointment of our Committee is earnest of Government's own consciousness of their responsibilities in the matter and that this would permeate down to the last man in the industry without which positive and lasting results cannot be achieved. In particular, we believe that in these formative years of the public sector in the steel industry in which substantial public funds are invested and public aspirations are founded, cost consciousness and cost discipline would be inculcated at all levels in such a manner that it forms a permanent part of the mental outlook of all.



NOTE ON IMPACT OF DEVALUATION

17.1. Devaluation of the Rupee took place after the draft of this Report had been prepared, and since by that time all the detailed studies on which the Report is based had been completed, we have thought it best to finalise the Report on the basis of the old external value of the Rupee. A study of the impact of devaluation on the cost of production of steel and related matters will be not only time-taking and, therefore, a cause for further delay in the submission of this Report, but also, in the nature of things any conclusions that might be drawn in the immediate future as to the likely effect of devaluation on the steel industry will be somewhat speculative.

17.2. While, immediately, because of the devaluation the steel industry will be in a better situation than before for export promotion at competitive prices, it appears that even then support with a reduced subsidy would be necessary. Conditions generated by the Indo-Pakistani conflict and subsequent events have already compelled the steel industry to plan and work for large scale import substitution by indigenous effort and these efforts must be continued with the same zeal even if foreign aid becomes more readily available and the exchange position eases. Even so import will have to be continued on many things such as rolls, certain raw materials and maintenance spares. A rough estimate made by HSL of the probable increased costs for these imported materials because of devaluation of the Rupee, suggests that in the Public Sector Steel Plants we may have to count on an increase in expenditure of about 5% per tonne of saleable steel. All of which may mean a total reduction in profitability for HSL in the year 1966-67 by Rs. 3 to 4 crores.

17.3. In the matter of capital costs also, all expansions will entail considerable increased outlay. In Hindustan Steel alone if the present plans are undertaken, the increased cost is estimated at Rs. 165 crores and that also on the assumption that during the period of this expansion which will be during the 4th Plan period and perhaps in the first year of the 5th Plan period, Indian costs will increase only about 5%. But Indian costs are likely to increase by much more than 5%. The hope HSL had of

reducing their block capital per tonne of steel through the expansion programmes may not now be realised. However, it would not be worthwhile discussing in any further detail the effects of devaluation.

17.4. We would only say that the recommendations that we have made and the arguments that we have advanced in favour of these recommendations get reinforced emphasis in the context of the devaluation, and we confidently hope and trust that steel industry both in the Public Sector and the Private Sector will make all out efforts to further reduce the costs in order that the climate created by devaluation may help in developing vigorously both in abundance and in diversity our export market.

CHAIRMAN

(Dr. Harekrushna Mahatab, M.P.)

MEMBERS

(P. Venkatasubbaiah, M.P.) (S. N. Misra, M.P.)

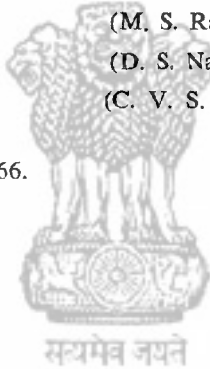
(Dr. B. R. Nijhawan) (M. S. Rao)

(Dr. Pritam Singh) (D. S. Nakra)

(N. Krishnan) (C. V. S. Mani) (Secretary).

New Delhi,

Dated 29th June, 1966.



Selling Price and Ex-works prices with duty and Excluding duty for Tatas (Untested)

(Ref. Para 1.3.1)

Period		Selling Price		Ex-Works Prices.			
From	To	Per M/T	Index	Per M/T	With Duty	Excluding Duty	Index
1-1-49	31-5-49	295	100				
1-6-49	11-12-49	328	111	235		230	100
12-12-49	31-12-49	298	101				
1-1-50	30-6-51	298	101	246		241	105
1-7-51	31-3-52	298	101	251		246	107
1-4-52	30-6-52	298	101	282		277	120
1-7-52	21-9-52	347	118				
22-9-52	31-3-53	387	131				
1-4-53	28-3-54	387	131	294		289	126
29-3-54	31-3-55	394	134				
1-4-55	30-6-55	394	134	399		394	170
1-7-55	30-9-55	423	143				
1-10-55	10-6-56	497	168				
11-6-56	15-5-57	522	177				

16-5-57	31-3-60	591	200	444	189	394	171
1-4-64	1-2-61	591	200	500	213	450	196
2-2-61	31-3-62	591	200				
1-4-62	29-4-62	591	200	510	217	460	200
30-4-62	1-6-62	622	211	540	230		
2-6-62	31-3-63	621	211	540	230		
1-4-63	30-6-63	621	211	548	233	468	203
1-7-63	29-2-64	626	212	558	237	488	212
1-3-64	12-4-64	630	214	568	242	478	208
13-4-64	27-2-65	645	219	583	248	492	214
28-2-65	31-3-65	660	224	598	254	492	214
1-4-65	19-8-65	663	225	598	254	492	214
20-8-65	Onwards	683	232	618	263	492	214

16-5-57	31-3-60	600	211	457	202	406	184
1-4-60	1-2-61	600	211	520	230	468	212
2-2-61	31-3-62	600	211				
1-4-62	29-4-62	600	211	530	235	478	216
30-4-62	1-6-62	632	222	560	248		
2-6-62	31-3-63	630	221	560	248		
1-4-63	30-6-63	630	221	568	251	486	220
1-7-63	29-2-64	645	226	578	256	508	230
1-3-64	12-4-64	660	232	598	265	508	230
13-4-64	27-2-65	675	237	613	271	522	236
28-2-65	31-3-65	690	242	628	278	522	236
1-4-65	19-8-65	693	243	628	278	522	236
20-8-65	Onwards	713	250	648	287	522	236

STATEMENT III
Selling Prices and Exworks Prices with Duty and Excluding Duty for Tatas (Unstated)
 BLACK SHEETS
 (Ref. Para I.3.1)

Period		Selling Prices		Ex-Works Prices	
From	To	Per M/T	Index	With duty	Excluding Duty
				Per M/T	Index
1-1-49	31-5-49	315	100	287	100
1-6-49	11-12-49	381	121		281
12-12-49	31-12-49	351	111		
1-1-50	30-6-51	351	111	298	104
1-7-51	31-3-52	351	111	295	103
1-4-52	30-6-52	351	111	344	120
1-7-52	21-9-52	401	127		338
22-9-52	1-3-53	450	143		
1-4-53	28-3-54	450	143	361	126
29-3-54	31-3-55	469	149		
1-4-55	30-6-55	469	149	319	181
1-7-55	30-9-55	477	151		513
1-10-55	10-6-56	527	167		
11-6-56	15-5-57	551	175		

16-5-57	31-3-60	620	197	564	197	501	178
1-4-60	1-2-61	620	197	663	231	599	213
2-2-61	31-3-62	740	235				
1-4-62	29-4-62	740	235	673	234	609	217
30-4-62	1-6-62	800	254	730	254		
2-6-62	31-3-63	789	253	730	254		
1-4-63	30-6-63	789	253	738	257	617	220
1-7-63	29-2-64	813	258	748	261	651	232
1-3-64	12-4-64	832	264	770	268	660	235
13-4-64	5-3-65	832	264	770	268	659	235
6-3-65	31-3-65	872	277	810	282	659	235
1-4-65	19-8-65*	872	277	810	282	659	235
20-8-65	Onwards*	897	285	835	291	659	235

Note (*) Price for Commercial S. T. 32 quality only instead of untested.

STATEMENT IV

Selling Prices, Exworks Prices with Duty and Excluding Duty for Tatas (Untested)

PLATES

Ref. para 1.3.1

Period		Selling Prices		Ex-Works Prices			
From	To	Per M/T	Index	With Duty		Excluding Duty	
				Per M/T	Index	Per M/T	Index
1-1-49	31-5-49	282	100	256	100	250	100
1-6-49	11-12-49	348	123				
12-12-49	31-12-49	319	113				
1-1-50	30-6-51	319	113	267	104	261	104
1-7-51	31-3-52	319	113	269	105	263	105
1-4-52	30-6-52	319	113	307	120	301	120
1-7-52	21-9-52	368	130				
22-9-52	31-3-53	427	151				
1-4-53	28-3-54	427	151	324	127	318	127
29-3-54	31-3-55	452	160				
1-4-55	30-6-55	452	160	402	157	396	156
1-7-55	30-9-55	482	171				
1-10-55	10-6-56	481	206				

11-6-56	15-5-57	605	215				
16-5-57	31-3-60	674	239	447	175	388	155
1-4-60	1-2-61	674	239	598	234	537	215
2-2-61	31-3-62	674	239				
1-4-62	29-4-62	674	239	608	238	547	219
30-4-62	1-6-62	729	259	660	258		
2-6-62	31-3-63	727	258	660	258		
1-4-63	30-6-63	727	258	668	261	555	222
1-7-63	29-2-64	742	263	678	265	586	234
1-3-64	12-4-64	767	272	705	275	595	238
13-4-64	5-3-65	767	272	705	275	594	238
6-3-65	31-3-65	777	276	715	279	594	238
1-4-65	19-8-65*	777	276	715	279	594	238
20-8-65	Onwards*	792	281	730	285	594	238

Note (*) Price for commercial S. T. 32 quality only instead of untested.

STATEMENT V
Basic Home Prices
 (Ref. Para I. 3. 6)

	U.S.A.		Germany		France		United Kingdom		India	
	Per Tonne	Index	Per Tonne	Index	Per Tonne	Index	Per Tonne	Index	Per Tonne	Index
<i>Light Bars</i>										
May '53	417	100	440	100	432	100	405	100	299	100
May '56	535	128	428	97	430	100	451	111	404	135
May '60	n. a.	..	474	108	427	99	555	137	460	154
Apr. '62	598	143	498	113	439	102	568	140	470	157
Nov. '65	622	149	n. a.	..	n. a.	..	539	133	537	180
<i>Structurals (Joists)</i>										
May '53	106	100	429	100	425	100	363	100	311	100
May '56	527	130	417	97	436	103	429	119	416	134
Apr. '60	n. a.	..	463	108	432	102	499	138	478	154
Apr. '62	n. a.	..	486	113	444	104	524	145	488	157
Nov. '65	599	148	n. a.	..	n. a.	..	576	159	562	182

Hot Rolled Sheets

May '53	.	.	.	398	100	573	100	584	100	501	100	365	100
May '56	.	.	.	492	124	586	102	600	183	547	109	523	143
Apr. '60	.	.	.	n.a.	..	634	111	570	98	626	125	609	167
Apr. '62	.	.	.	537	135	637	112	570	98	673	134	619	170
Nov. '65	.	.	.	557	140	n.a.	..	n.a.	..	770	154	704	193

Plates (Thick)

May '53	.	.	.	412	100	495	100	600	100	386	100	330	100
May '56	.	.	.	511	124	469	95	508	102	452	117	408	124
Apr. '60	.	.	.	n.a.	..	509	103	491	98	532	138	550	167
Apr. '62	.	.	.	558	135	535	108	491	98	553	143	560	170
Nov. '65	.	.	.	583	142	n.a.	..	n.a.	..	559	145	639	194

NOTE: (i) Foreign prices extracted from the publication of the Organisation for European Economic Corporation, Paris, on the Iron and Steel Industry in Europe.

(ii) Foreign prices converted to Indian currency at Rs. 4.78 per dollar (at exchange rates prior to devaluation)

(iii) Indian ex-works prices are exclusive of excise duty on ingot and product and represent tested categories.

(iv) 1965 Indian prices are based on IS-226—62 specification for standard category.

(v) Nov. 1965 prices are as given by Sir J.J. Ghandy in his letter dated 27-12-1965 to the Committee.

(vi) n.a.—Not available.

STATEMENT No. VI

TATAS

Comparison of the Actual works costs of Basic Steel Ingots Broken down by elements for 1948-49 and 1964-65

(Ref. Para 3.1.2)

Period	1948-49			1964-65			Increase over 1948-49			Analysis of increase		
	Quantity	Rate	Cost	Quantity	Rate	Cost	Per	Rate	Impact	Price	Usage	
		per	per		per	per	tonne	of	on total	Expense	Factor	
		tonne.	tonne.		tonne	tonne		increase	increase	Factor		
Production	9,16,216 Tonnes			1,957,935 Tonnes			1,041,719 Tonnes (113.7%)					
Details	Kgs.	Rs.	Rs.	Kgs.	Rs.	Rs.	Rs.	%	%	Rs.	Rs.	Rs.
<i>I. Materials.</i>												
(a) Coal . . .	1288	20.91	26.93	1234	50.98	62.90	35.97	134	23.8	38.73	(—)	2.76
(b) Iron Ore . . .	1569	7.21	11.31	1552	22.01	34.16	22.85	202	15.1	23.22	(—)	0.37
(c) Limestone (Blast Furnace)	368	7.97	2.93	287	30.55	8.78	5.85	260	5.1	8.21	(—)	2.36
(d) Dolomite (Blast Furnace)	2	12.32	0.02	47	38.82	1.83	1.81			0.06		1.75
(e) Scrap . . .	274	38.28	10.49	286	110.87	31.71	21.22	202	14.0	19.89		1.33
(f) Manganese Ore . . .	16	21.29	0.34	28	29.29	0.83	0.49	144	0.3	0.13		0.36

(g) Ferro-Alloys	15.52	26.80	4.11	15.19	917.71	13.94	9.83	239	6.5	10.13	(—) 0.30
(h) Others (Scale, etc.)	..	..	0.14	..	..	0.38	0.24	171	0.1	0.24	..
TOTAL	..	..	56.27	..	..	154.53	98.26	175	64.9	100.61	(—) 2.35
LESS (i) Nut Coke, Breeze etc.	141	5.53	0.78	152	25.72	3.91	3.13	401	2.1	2.85	0.28
(ii) Scrap	103	24.56	2.53	59	115.10	6.79	4.26	168	2.8	9.33	(—) 5.07
NET TOTAL (1)	..	..	52.96	..	..	143.83	90.87	172	60.0	88.43	2.44

II. Operating Charges.

1. FLUXES: (a) Limes- tone.	69	16.07	1.11	101	33.52	3.39	2.28	315	3.1	1.20	1.08
(b) Dolomite	32	11.59	0.37	71	38.89	2.75	2.38	216	0.3	0.87	1.51
(c) Flourspar	0.63	300.90	0.19	1.64	365.58	0.60	0.41	260	11.6	0.04	0.37
2. FUEL: Producer Gas Fuel Oil.	..	..	6.77	..	..	24.47	17.60	..	..	..	..
Tar, c.o. & B.F. Gas.	..	..	9.73	..	..	13.57	3.84	40	2.5	3.84	..
3. Salaries and Wages	..	..	3.90	..	..	8.38	4.48	115	3.0	4.48	..
4. Steam etc. (a) Steam (b) Water & Power.	..	..	1.89	..	..	5.86	3.97	210	2.6	3.97	..
5. Stores	..	..	2.75	..	..	6.26	3.51	128	2.3	3.51	..
6. Services	..	..	5.05	..	..	10.50	5.45	108	3.6	5.45	..
7. General Works Ex- penses.	..	..	7.39	..	..	15.25	7.86	106	5.2	7.86	..
8. Provision for Re- building etc.	..	..	6.86	..	..	17.87	11.01	160	7.3	11.01	..
9. Refractories	..	..	2.83	..	..	5.39	2.56	90	1.7	2.56	..

10. Ingot Moulds & Bottoms etc. . .	1.96	5.20	3.24	165	2.1	3.24	..
11 Bye-product Plant expenses (including Limestone, Sinter etc.)	4.45	8.58	4.13	93	2.7	4.13	..
III. TOTAL (I+II)	108.21	271.80	163.59	151	108.0	158.19	5.40
IV. Less Credits for (a) Tar	35.7	34.98	1.25	38.5	120.00	4.62	3.37
(b) Ammonia	11.1	220.00	2.44	11.1	245.00	2.73	0.29
(c) Gas & Others	..	..	8.72	..	..	17.25	8.53
V. TOTAL WORKS COST (Excluding excise duty on Ingot) (III-IV)	95.80	247.20	151.40	158	100.0	146.34	5.06

STATEMENT NO. VII



STATEMENT
Comparison of the Actual Works Cost of Coke, Hot Metal

(Ref. Para 4'4

Coke Ovens (Coke)						
	Production	Materials	Conversion costs	Less Credits	Works costs	Production
	Million/tonnes					Million/tonnes
1. 1938-39 Tatas	0.879	9.88	2.52	3.05	9.35	1.036
2. 1948-49 Tatas	0.829	32.27	9.25	8.73	32.79	0.932
3. 1954-55 Tatas	1.114	32.82	11.08	13.42	30.48	1.150
IISCO	0.744	25.46	12.56	11.75	26.27	0.526
4. 1960-61 Tatas	1.420	54.61	16.14	18.24	52.51	1.588
IISCO	1.360	44.14	15.62	15.62	44.14	0.928
Rourkela	0.527	62.42	16.29	18.48	60.23	0.203
Bhilai	0.679	68.49	20.87	16.03	73.33	0.363
Durgapur	0.480	47.84	16.74	12.60	51.98	0.168
5. 1961-62 Tatas	1.362	59.07	18.00	19.76	57.31	1.648
IISCO	1.440	46.07	15.79	15.81	46.65	0.952
Rourkela	0.646	58.55	13.61	15.30	56.86	0.372
Bhilai	0.958	72.80	15.73	18.56	70.06	0.548
Durgapur	0.891	48.73	12.75	12.13	49.35	0.162
6. 1962-63 Tatas	1.461	64.05	18.50	20.78	61.77	1.767
IISCO	1.434	49.93	18.93	17.58	51.28	1.072
Rourkela	0.838	75.73	15.69	20.07	71.35	0.694
Bhilai	1.088	83.16	18.98	22.84	79.30	0.807
Durgapur	1.215	52.54	16.44	13.98	55.00	0.567
7. 1963-64 Tatas	1.276	81.04	24.04	24.59	80.49	1.812
IISCO	1.398	54.78	20.63	21.19	54.22	1.013
Rourkela	0.927	91.58	15.99	21.52	85.85	0.737
Bhilai	1.105	95.81	20.88	24.40	92.29	0.444
Durgapur	1.337	56.89	14.66	14.52	57.03	0.647
8. 1964-65 Tatas	1.321	80.99	25.89	24.25	82.63	1.888
IISCO	1.454	55.94	20.97	20.69	50.22	0.930
Rourkela	0.950	88.91	17.15	18.49	87.57	0.986
Bhilai	1.203	96.66	20.88	24.28	93.26	0.369
Durgapur	1.234	58.81	18.64	15.24	62.21	0.828

NOTE: (i) Coke costs at Hindustan Steel Plants are on 'DRY BASIS'.

(ii) IISCOS hot metal costs for 1954-55 is the average of basic & Foundry grades.

No. VII

(Basic) and steel Ingots (Basic) at the Different Steel Plants for Several periods.
(Rs. per tonne)

Blast Furnaces (Hot Metals Basic)					Steel Melting Shops (Basic Steel Ingot)			
Materials	Con- version costs	Less Credits	Works cost	Produc- tion	Materials	Con- version costs	Less Credits	Works cost
Million /tonnes								
15.80	4.07	2.32	17.55	0.959	23.06	10.46	0.61	32.91
45.17	11.31	6.25	50.23	0.916	65.85	32.16	2.21	95.80
51.27	16.11	6.46	60.92	1.055	83.62	43.90	2.10	125.42
55.24	18.64	3.80	70.08	0.537	99.92	39.59	0.92	138.59
100.86	19.61	9.40	111.07	1.625	143.22	64.38	3.32	204.28
98.10	20.26	8.35	110.01	0.914	151.44	59.63	1.41	209.66
111.29	28.93	21.80	118.42	0.212	159.91	118.64	7.75	270.80
98.30	32.56	17.80	113.06	0.394	142.76	97.03	3.18	236.61
118.95	31.31	15.53	134.73	0.168	161.43	119.41	6.22	274.62
106.24	20.08	10.62	115.70	1.646	153.67	67.85	3.70	217.82
104.34	21.97	9.25	117.06	0.934	158.54	61.72	1.20	219.06
117.47	30.91	19.72	128.66	0.356	166.21	111.80	8.80	269.21
98.83	30.55	19.36	110.02	0.790	135.73	90.68	4.34	222.07
110.71	21.75	14.04	118.42	0.462	165.34	84.39	2.39	247.34
109.98	21.02	11.19	119.81	1.798	157.59	67.35	3.58	221.36
109.80	24.24	9.85	124.19	1.002	165.40	61.26	2.40	224.26
123.55	31.71	17.30	137.96	0.706	168.09	80.89	4.63	244.35
110.75	31.85	20.16	122.44	1.033	142.40	88.25	6.76	223.89
121.10	24.25	15.85	129.50	0.729	156.04	79.99	3.15	232.88
127.94	22.11	12.53	137.52	1.894	171.05	67.17	3.90	234.32
110.50	25.87	10.42	125.95	1.027	166.71	60.21	2.06	224.86
133.13	33.66	17.12	149.67	0.795	169.19	73.84	3.20	239.83
110.80	30.43	18.82	122.41	1.133	140.95	78.81	5.35	214.41
119.99	24.29	16.15	128.13	0.972	149.95	77.01	10.92	216.04
130.81	23.99	11.74	143.06	1.958	183.70	68.29	4.79	247.20
121.84	29.15	10.46	140.53	0.950	180.14	67.63	1.28	246.49
135.93	30.02	18.24	147.71	0.979	168.36	67.39	3.04	232.71
126.32	31.14	19.60	137.86	1.118	156.71	83.85	5.24	235.32
120.66	26.60	17.58	129.68	1.006	149.18	82.79	5.02	226.95

STATEMENT NO.

Comparison of Actual works cost of Basic steel ingot for 194 8/49
at the Different steel Plants Broken
(Ref. Para

Details	1948/49	
	TATAS	TATAS
PRODUCTION (TONNES)	916,216	1,625,127
1. Materials :		
	Rs.	Rs.
(a) Coal (Vide Annexure)	26.93	51.89
(b) Fuel Oil Do.	..	..
(c) Iron Ore Do.	11.31	29.29
(d) Limestone & Dolomite Do.	2.94	9.75
(e) Scrap Do.	10.49	21.05
(f) Ferro-Alloys	4.11	11.18
(g) Others	0.44	0.91
TOTAL (1)	56.22	124.07
2. Operating costs :		
(a) (i) Coke Ovens:	4.79	12.83
(ii) Bye-Product Plants.	2.93	2.51
(b) (i) Blast Furnace Exps.	8.95	15.83
(ii) Relining	1.62	2.27
(iii) Sintering Plant Exps.	..	2.32
(iv) Pig Casting Exps.	0.12	0.07
(c) (i) Melting Shop Exps.	27.32	51.84
(ii) Relining & Repairs Furnaces.	4.88	12.06
(iii) Refractories	2.72	5.56
(iv) Ingot Moulds, etc.	1.96	4.69
(d) Extra Cost due to use of Foundry Grade Iron	..	..
TOTAL (2)	55.29	109.98
3. GRAND TOTAL (1+2)	111.51	234.05
4. Less Credits		
(i) Scrap	2.53	3.93
(ii) Gas & By Products	11.88	21.73
(iii) Others (breeze etc.)	1.30	4.11
TOTAL (4)	15.71	29.77
NET WORKS COST TOTAL (3)-(4)	95.80	204.28

VIII

1960/61 and 1964/65 (Per Tonne)

Down by Elements of Costs

4'4)

1960-61				1964/65				
IISCO	Rourkela	Bhilai	Durgapur	TATAS	IISCO	Rourkela	Bhilai	Durgapur
914,159	212,337	393,518	167,705	1,957,935	949,887	979,396	1,117,827	1,006,236
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
44.73	57.56	48.61	43.05	62.90	55.05	70.34	62.49	43.76
				5.13				0.27
39.98	38.45	22.31	39.97	33.90	49.02	34.09	24.32	47.65
12.83	13.29	6.61	11.86	10.60	16.30	9.20	8.78	10.03
11.35	34.42	31.09	36.13	31.73	11.21	27.78	23.73	19.01
14.05	7.45	13.60	8.69	13.93	14.83	9.74	16.31	16.62
1.87	3.20	3.18	2.28	0.92	1.99	4.25	2.30	1.28
124.81	154.37	125.40	141.98	159.11	148.40	155.40	137.93	138.62
13.13	15.02	14.81	15.06	16.02	17.03	13.56	13.50	13.87
2.70				3.22	3.61			
18.82	26.58	23.25	22.07	18.50	27.67	21.52	20.97	18.58
1.75	2.52	3.74	3.42	3.42	1.74	4.30	2.91	3.44
				3.64			4.29	
0.15	0.26	0.24	0.71	0.10	0.20	0.14	0.01	0.14
46.68	83.06	54.93	89.15	55.94	52.16	42.95	48.85	52.35
3.62	0.58	27.49		12.15	4.98		22.63	
16.60	19.88		18.30	5.17	13.64	11.85		21.66
7.32	14.95	14.68	11.11	5.20	9.51	12.53	12.37	6.52
	0.30	1.38	2.67			3.81	7.83	0.54
110.77	163.15	140.52	162.49	123.36	130.54	110.66	133.36	117.10
235.58	317.52	265.92	304.47	282.47	278.94	266.06	271.29	255.72
1.92	7.84	3.18	5.87	6.77	1.78	3.04	4.17	4.44
21.45	37.73	25.34	23.58	24.30	26.88	30.18	28.40	23.83
2.55	1.15	0.79	0.40	4.20	3.79	0.13	3.40	0.50
25.92	46.72	29.31	29.85	35.27	32.45	33.35	35.97	28.77
209.66	270.80	236.61	274.62	247.20	246.49	232.71	235.32	226.95

ANNEXURE

STATEMENT NO.

(Ref. Para

Basic Steel Ingot. Comparison of prices of main materials, Railway
(per tonne)

Details	1948/49	
	Tatas	Tatas
	Rs.	Rs.
(A) Rates for materials :		
(a) Coal	(i) Prices	15.45 23.88
	(ii) Railway freight	5.46 10.31
	TOTAL (a)	20.91 34.19
(b) Iron Ore	(i) Prices	4.70 11.47
	(ii) Railway freight	2.51 7.84
	TOTAL (b)	7.21 19.31
(c) Limestone & Dolomite	(i) Prices	4.99 11.95
	(ii) Railway freight	3.01 11.01
	TOTAL (c)	8.00 22.96
(d) Scrap :	Prices	38.28 79.73
(e) Fuel oil :	Prices	
(B) Usages per tonne of ingot		
	Kgs.	Kgs.
(i) Coal	1288	1518
(ii) Iron Ore	1569	1517
(iii) Limestone & Dolomite	368	425
(iv) Scrap	274	264
(v) Fuel oil	..	..
(C) Cost of Materials per tonne of ingot (A x B)		
	Rs.	Rs.
(a) Coal	(i) Prices	19.90 36.25
	(ii) Railway freight	7.03 15.64
	TOTAL (a)	26.93 51.89
(b) Iron Ore :	(i) Prices	7.37 17.40
	(ii) Railway freight	3.94 11.89
	TOTAL (b)	11.31 29.29
(c) Limestone & Dolomite	(i) Prices	1.84 5.08
	(ii) Railway freight	1.10 4.67
	TOTAL (c)	2.94 9.75
(d) Scrap	..	10.49 21.05
(e) Furnace Oil	..	..

TO

VIII

4·4)

freight and usages in 1948/49, 1960/61 and 1964/65 for all plants

(per tonne)

1960/61				1964/65				
IISCO	Rour- kela	Bhilai	Durgapur	Tatas	IISCO	Rourkela	Ehilai	Durgapur
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
22·91	N.A.	25·77	31·36	37·64	28·66	41·74	40·55	30·90
6·89	N.A.	18·50	7·50	13·34	9·14	15·16	23·34	9·88
29·80	40·98	44·27	38·86	50·98	37·80	56·90	63·89	40·78
9·53	N.A.	9·17	N.A.	11·33	15·09	16·14	9·77	14·15
13·96	N.A.	6·30	N.A.	10·68	15·26	9·04	7·84	16·85
23·49	24·45	15·47	26·30	22·01	30·35	25·18	17·61	31·00
8·79	N.A.	11·27	N.A.	16·23	15·38	17·83	16·58	13·04
19·66	N.A.	1·41	N.A.	15·45	22·10	8·40	4·48	19·51
28·45	22·70	12·68	30·74	31·68	37·48	26·23	21·06	32·55
61·04	132·88	146·65	148·68	110·94	57·32	94·20	93·43	83·74
..	..	..	..	168·79	..	..	..	..
Kgs.	Kgs.	Kgs.	Kgs.	Kgs.	Kgs.	Kgs.	Kgs.	Kgs.
1501	1405	1098	1108	1234	1456	1236	978	1073
1702	1573	1442	1520	1540	1615	1354	1381	1537
451	585	521	386	335	435	351	417	308
186	260	212	243	286	196	295	254	227
..	..	..	..	30	..	..	..	2
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
34·39	N.A.	28·30	34·75	46·45	41·73	51·59	39·66	33·16
10·34	N.A.	20·31	8·30	16·45	13·32	18·75	22·83	10·60
44·73	57·56	48·61	43·05	62·90	55·05	70·34	62·49	43·76
16·22	N.A.	13·22	N.A.	17·45	24·37	21·85	13·49	21·75
23·76	N.A.	9·09	N.A.	16·45	24·65	12·24	10·83	25·90
39·98	38·45	22·31	39·97	33·90	49·02	34·09	24·32	47·65
3·96	N.A.	5·87	N.A.	5·44	6·69	6·26	6·91	4·02
8·87	N.A.	0·74	N.A.	5·16	9·61	2·94	1·87	6·01
12·83	13·29	6·61	11·86	10·60	16·30	9·20	8·78	10·03
11·35	34·42	31·09	36·13	31·73	11·21	27·78	23·73	19·01
..	..	..	..	5·13	..	..	..	0·27

STATEMENT No. IX
INCIDENCE OF GOVERNMENT LEVIES

Per Tonne

(Ref. Para 6·1)

PARTICULARS	1948-49	1964-65			
	TATAS	TATAS	IISCO	BHILAI	DURGA- PUR
	Rs.	Rs.	Rs.	Rs.	Rs.
(A) ON INGOT					
1. Royalty on materials	1.08	3.51	3.32	1.98	2.69
2. Cess on minerals	0.14	0.60	1.07	2.67	0.97
3. Sales tax	..	1.55	1.30	2.23	1.40
4. Excise duty (including maintenance material)	3.95	40.99	40.48	40.27	40.00
5. Railway freight	13.00	43.00	54.75	37.85	46.50
6. Import duty	0.42	2.11	2.83	2.67	..
7. Electricity duty	..	1.30	2.74	1.13	..
8. Rates and taxes	0.09	0.06	0.53	..	..
9. Apprentice Act	..	0.23	0.11	0.18	..
	18.68	93.65	108.13		
(B) ON SALEABLE STEEL					
1. Royalty on minerals	1.45	4.37	4.15	2.46	2.88
2. Cess on minerals	0.18	1.13	1.34	3.32	1.24
3. Sales tax	..	3.06	1.65	2.77	1.74
4. Excise duty— Ingot	5.32	51.28	50.95	50.11	N.A.
Excise duty— Product	..	55.67	47.04	N.A.	N.A.
5. Railway freight	16.90	55.90	68.66	47.10	61.40
6. Import duty	1.40	5.71	3.54	4.62	..
7. Electricity duty	..	3.63	4.68	1.41	..
8. Rates and taxes	0.30	0.18	0.66	..	..
9. Apprentice Act	..	0.73	0.14	0.22	..
	25.55	181.66	182.81		

Note : Figures for Bhilai and Durgapur are incomplete.

STATEMENT No. X

(Para 7.2.1)

INDEX OF IRON ORE PRICES

	1956	1960	1961	1962	
GERMANY . . .	100	114	102	104	
FRANCE . . .	100	128	128	129	
U. K.	100	126	126	126	
	1954-55	1960-61	1961-62	1962-63	1963-64 1964-65
TISCO	100	162	175	169	180 184
IISCO	100	151	154	164	166 195



STATEMENT No XI

(Ref. Para 7.4)

GRADEWISE PRICES OF COKING COAL

Prices according to last quarter of (@)

Grade	1958	1959	1960	1961	1962(*)
	Rs./Tonne	Index	Rs./Tonne	Index	Rs./Tonne
Selected A	21.19	100	21.77	103	22.63
				107	22.93
Selected B	20.21	100	20.78	103	21.64
				107	21.95
Grade I	19.35	100	19.93	103	20.79
				107	21.09
Grade II	18.24	100	18.82	103	19.67
				108	19.98
					22.06
					20.33
					27.47
					26.48
					25.50
					24.02
					23.53
					22.79
					22.30
					22.06
					20.33

(@) Price at F.O.R. Colliery railway siding.

(*) Revised classification of coking coal based on Coal Controller's notifications with effect from the 20th February, 1962.

STATEMENT No. XIII

COST OF WASHED COAL IN 1964-65 (Ref. para 8.1)

Washeries	Dugda	Bhojudih	Kargali
	Million/ Tonnes	Million/ Tonnes	Million/ Tonnes
(A) Capacity Yield Etc.			
1. Capacity per annum (Raw Coal) .	2.400	2.000	2.200
2. Actual Coal used .	1.001	1.341	1.683
3. Capacity worked (2/1) .	41.71%	67.05%	76.50%
4. Actual Yield of Washed Coal .	0.821	1.147	1.200
Actual Yield (4/2) .	82.02%	85.53%	71.30%
5. Capital cost (Rs. /million) .	69.65	64.00	33.89
6. Capital Cost per Tonne on.			
(i) Capacity (Rs.) .	29.02	32.00	15.40
(ii) Actual Coal Washed .	69.58	47.73	20.14
(iii) On output of washed Coal .	84.84	55.80	28.24
7. Average ash in Coal .	20.33%	21.07%	18.00%
8. Average ash in Washed Coal .	17.31%	16.88%	16.00%
(B) Washery Costs/Per Tonne			
	Rs.	Rs.	Rs.
(a) Price for Raw Coal .	24.63	25.33	25.41
Freight .	6.81	6.30	..
Cess .	2.17	2.17	..
Handling Expenses .	0.04	0.05	..
TOTAL .	33.65	33.85	25.41
(b) Usage (Kgs.) .	1223	1172	1402
(c) Cost of Washed Coal .			
Coal Cost (a) × (b) .	41.15	39.67	35.63
Labour .	0.45	0.44	2.08
Stores and Spares .	0.41	0.14	0.87
Power .	1.01	0.53	0.51
Water .	0.06	0.03	0.07
Repair and Maintenance .	1.56	1.10	0.42
Miscellaneous .	2.45	1.15	2.11
Head Office expenses .	0.35	0.16	0.31
Yard operation .	1.67	1.15	..
Depreciation .	3.27	1.94	1.18
Interest .	1.96	0.56	1.08
TOTAL COST .	54.32	46.87	44.26
LESS CREDIT FOR MIDDINGS :	3.29	..	2.64
(d) Net Cost of WASHED COAL .	51.03	46.87	41.62
(e) Conversion Cost (d)-(a) .	17.38	13.02	16.21

STATEMENT No. XIV



STATEMENT No. XIV

Comparative performance data of blast furnaces (1964-65)

Steel Plant	Furnace volume (t.m ³)	Production tonnes/day	Availability (%)	Coke rate, kg/tonne of hot metal	Hot blast temperature, °C	1. Slg volume, kg/tonne of hot metal
1	2	3	4	5	6	7
TISCO						
A	860	901	1.048	92.5		802
B	624	757	1.212	93.0	..	599
C	606	758	1.250	92.3	..	575
D	938	959	1.022	94.6	..	557
E	558	660	1.182	94.8	..	561
F	1,338	1,394	1.042	92.8	..	630
TOTAL AVERAGE	4,924	5,429	1.101	93.7	84.3	546
UISCO						
1.	434	..	..	95.2		777
2.	434	..	..	94.5	649	..
3.	1041	..	..	90.2	675	..
4.	1041	..	..	97.0		..
TOTAL AVERAGE	2,950	3,108	1.079	94.3	1001	646
NGURKELA						
1.	995	1003	1.009	97.9	..	543
2.	995	1056	1.062	93.0	..	542
3.	995	975	0.980	91.4	..	552
TOTAL AVERAGE	2,985	3,034	1.031	94.0	942	546
BHILAI						
1.	919	1108	1.200	97	..	713
2.	919	1071	1.165	98	..	761
3.	919	1028	1.120	97.5	..	746
TOTAL AVERAGE	2,757	3,207	1.162	97.5	839	740
DURGAPUR						
1.	1171	1184	1.01	90.9	..	507
2.	1171	1158	0.987	91.3	..	495
3.	1171	1254	1.07	90.7	..	489
TOTAL AVERAGE	3,513	3,596	1.023	94.0	882	497
All India						
TOTAL AVERAGE	17,192,000	18,451,971	1.079	94.7	901	601

(1) From centre line of tuyers to stockline (lowered position of big bell).

(2) Availability is expressed as percent of total calendar hours i.e. 8760.

STATEMENT No. XV

PRODUCTION FROM O.H. FURNACES

Ref. para 11'2

Open hearth production (ingots and butts), tonnes/hr.

Plant	Straight open hearth furnaces	Duplex	Semi-Duplex
TISCO . .	16-19	N.A.	16.89—18.12
IISCO . .		Tilting furnace, 20.1 to 20.9 Fixed furnace, 6.2 to 6.8	
Rourkela . .	8.3—8.5		
Bhilai . .	250 T furnace 25.1 to 27.0* 500 T furnace 30.6*		
Durgapur . .	200 T—16.50 100 T—9.60		
Japan† . .	19-21		
U.S.A. . .	28* } 250 T. Fur- 24 } nace		
U.S.S.R. . .	100 T—18.5 250 T—35.2 500 T—52.6		

*Oxygen used.

†National average.



STATEMENT No. XVI

(Ref. para 11.2.1)

Heat Consumption in Open Hearth Furnaces
Heat Consumption, 10⁶ Kcal/tonne.

Plant	Straight O.H. furnaces	Duplex	Semi-Duplex
TISCO . . .	2.68—2.75	0.77—0.90	1.18.—1.28*
IISCO . . .	1.303—1.149 (Average for all furnaces)		
Rourkela . . .	1.39		
Bhilai . . .	0.882—1.019†		
Durgapur . . .	200 T—1.31 to 1.61 100 T—2.23 to 2.56		

*Oxygen consumption 9.0 to 12.14m³/ingot tonne.†Oxygen consumption, 30.2 to 31.5m³/ingot tonne.

STATEMENT No. XVI-

(Ref. para 11.2.1)

Performance data of Open Hearth Furnaces in Japan

Data on Japanese open Hearth Furnaces

Year	Output per charge (tonnes)	Output per hour (tonnes)	Yield %	Heat Consumption			Average No. of Heat furnace con- sump- tion 10 ⁶ kcal	No. of in opera- tion
				(1000 Kcal) Heavy Oil	Cokes	Gas		
1959	96.1	16.72	89.6	802	1,718	555	0.758	130
1960	89.9	18.32	89.2	782	1,887	514	0.702	130
1961	89.4	19.76	88.7	748	..	456	0.673	137
1962	93.6	21.00	89.5	680	..	487	0.643	106
1963	93.0	19.79	89.1	658	..	524	0.686	114
1964	95.6	20.30	88.6	704	..	494	0.691	110

STATEMENT No. XVI-B

(Ref. para 11.2.1)

Performance data of Open Hearth Furnaces in U.S.A.

Data on American Open Hearth Furnaces

Furnace capacity tonnes	Average size of heat, tonnes	Average time of heat, hrs.	Tonnes per melting hour	Tonnes per operating hour	Heat con- sumption Tonnes 10 ⁶ kcal
<i>Hot Metal Plants</i>					
100	105.8	9.2	13.15	11.56	1.012
150	149.1	10.1	16.10	14.82	0.902
200	201.1	11.1	19.81	18.07	0.965
250	247.7	11.1	24.71	22.28	0.925
300	309.3	10.4	32.82	29.68	0.842
<i>Duplex</i>					
150	150.6	3.7	46.13	40.74	0.400
<i>Cold Iron Plants</i>					
80	85.9	9.7	9.73	8.90	1.215
100	116.8	11.6	10.70	9.79	1.177
<i>Heats using Oxygen.</i>					
225—T (nearly 70% hot metal)	231.5	9.81	27.04	23.57	Oxygen/ Tonne, =337 cft. oil con- sumed charge to tap-17.9 gallons per tonne

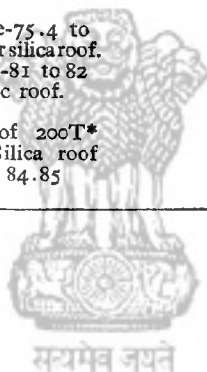
STATEMENT No. XVII

(Ref. para II.2.2)

Availability of Open Hearth Furnace
Open hearth furnace availability, %

Plant	Straight open hearth practice	Duplex	Semi-Duplex
TISCO	. 80 T fce—75% (Silica roof)	200 T tilting fce (silica roof)—86 to 89%	200 T fce—93 to 94 % (basic roof).
IISCO	. 83—88% (for all furnaces)		
Rourkela	. 80T fce—75.7 for silica roof 80 T fce— 89% for basic roof.		
Bhilai	. 250 T fce—75.4 to 80.8 for silica roof. 250 T fce—81 to 82 for basic roof.		
Durgapur	. Basic roof 200T* 86.3 Silica roof 100T* 84.85		

*Without oxygen.



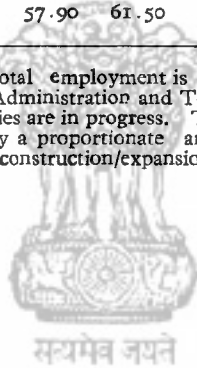
STATEMENT No. XVIII

(Ref. para 12.4)

	Production, Employment & Productivity					
		Bhilai	Durgapur	Rourkela	TISCO	IISCO
Ingot production in '000 tonnes	1962-63	1060	731	700	1801	1002
	1963-64	1143	972	800	1894	1026
	1964-65	1113	1006	979	1958	950
Total employment	1962-63	20100	15900	15600	37693	17408
	1963-64	21176	17215	17340	38166	17623
	1964-65	21000	20400	18300	37659	17322
Employment in works	1962-63	16940	12592	12660	29226	14544
	1963-64	17207	13555	13777	29452	14678
	1964-65	18885	14714	14344	28720	14624
Employment in Administration	1962-63	..	..	..	2666	..
	1963-64	3603	2509	..	2771	913
	1964-65	3566	2488	..	2891	912
Employment in Township	1962-63	..	..	..	..	..
	1963-64	3072	2328	..	4655	1792
	1964-65	3292	3339	..	4739	1786
Output per employee (Works Department)	1962-63	63.8	58.1	55.3	61.7	69.1
	1963-64	66.5	72.0	58.1	64.5	69.0
	1964-65	59.1	69.0	68.1	68.0	65.0

Departments	Cost per tonne of Ingot Steel in Rupees (1963-64)				
	Bhilai	Durga- pur	Rour- kela	TISCO	IISCO
All process departments upto ingot stage	8.71	8.24	8.92	10.34	20.41
All Works Departments	43.10	48.50	45.01	49.95	57.55
Centralised Maintenance and Service departments only	22.18	20.16	13.56	27.27	17.38
Administration Departments	9.12	6.00	..	5.60	5.38
Township departments	5.72	6.97	..	5.60	5.51
Total personnel costs (exclu- ding P.F., ESI, Gratuity, Annual bonus)	57.90	61.50	54.00	64.00	68.40

Note 1 : The figures against total employment is not the sum total of employment in Works, Administration and Township where construction/expansion activities are in progress. Total employment & Costs have been reduced by a proportionate amount depending on the costs transferred to construction/expansion.



APPENDIX 1

Government of India

Ministry of Steel & Mines
Department of Iron & steel

New Delhi, the 28th August, 1965.

RESOLUTION

NO. COY-3(12)65. The Government have been concerned for some time past about the rising cost of production of steel and have had under consideration the appointment of a Committee to examine this matter in detail, analyse all the factors going into the cost, assess the reasons for the increases and advise Government on the measures necessary to reduce the cost. Government have now decided to constitute a Committee with the following gentlemen:

Chairman

1. Shri Harekrushna Mahatab, M.P.

Members

2. Shri P. Venkatasubbaiah, M.P.
3. Shri S. N. Mishra, M.P.
4. Shri Jehangir Ghandy, Director, The Tata Iron & Steel Co. Ltd., and Director, Tata Industries Private Ltd.
5. Shri S. L. Kirloskar, President, Federation of Indian Chambers of Commerce & Industry.
6. Shri B. K. Sethi, Managing Director, Vinod Mills, Ujjain,
7. Shri Karnail Singh, Chartered Engineer and Industrial Consultant, New Delhi.

8. Shri B. R. Nijhawan, Director, National Metallurgical Laboratory, Jamshedpur.
9. Shri M. S. Rao, Chairman, Hindustan Steel Limited, Ranchi.
10. Dr. Pritam Singh, Director, National Council of Applied Economic Research.
11. Shri N. Krishnan, Chief Cost Accounts Officer, Ministry of Finance, New Delhi.
12. Shri D. S. Nakra, Financial Adviser, Hindustan Steel Limited, Ranchi.

Shri C. V. S. Mani, Deputy Secretary in the Ministry of Steel & Mines is appointed as the Secretary to this Committee.

The Committee will submit its report in 4 months time. (This time was later extended till 30th June 1966).

Sd./- K. C. Madappa,
Joint Secretary

28-8-65



APPENDIX 2

Members of the Working Groups constituted by the Mahatab Committee

Inventories

1. Shri H. Bhaya, Secretary, Hindustan Steel Ltd., Ranchi.
(Convenor)
2. Shri C. de. B. Griffiths, Controller of Accounts and Audit, Indian Iron & Steel Co., Burnpur.
3. Shri O. R. Chandrasekharan, Dy. Superintendent, Stores Dept., Tata Iron & Steel Co., Jamshedpur.
4. Shri K. Ramamurthy, Deputy Chief Adviser (Factories), Productivity Centre, Bombay.

Capital Costs

1. Shri S. F. Braganza, Managing Director, Hindustan Steel-works Construction Corp. Ltd., Calcutta. (Convenor)
2. Dr. P. Prasad, Economic Adviser, Hindustan Steel Ltd., Ranchi.
3. Shri K. P. Mahalingam, Tata Iron & Steel Co. Ltd.
4. Shri C. de. B. Griffiths, Controller of Accounts and Audit, Indian Iron & Steel Co., Burnpur.
5. Shri R. D. Lalkaka, Dastur & Co.

Coal Washeries

1. Shri S. N. Rao, Coal Mining Adviser, Ministry of Railways.
2. Shri R. K. Chandrasekharan, Deputy Secretary, Ministry of Iron and Steel.

Plant Operation

1. Dr. S. Bhattacharya, Chief Metallurgist, Bokaro Steel Ltd.
2. Shri A. C. Banerji, Dy Chief Engineer, Central Engg. and Design Bureau, Hindustan Steel Ltd., Ranchi.

Personnel Costs :—

1. Shri R. P. Billimoria, Director of Personnel, The Tata Iron and Steel Co., Ltd. (Chairman).

2. Shri P. K. Das, Chief, Manpower, Productivity and Training Division. Hindustan Steel Ltd., (Member Convenor).

3. Shri R. M. Sen Gupta, Group Manager (Personnel) The Indian Iron and Steel Co. Ltd.

4. Dr. S. D. Punekar, Tata Institute of Social Sciences, Bombay.

